The North Central Association Quarterly

CONTENTS FOR MARCH, 1931

VOL. V—NO. 4

THE
North Central Association
QUARTERLY

Volume V MARCH, 1931 Number 4

News Notes and Editorial Comments

By C. O. DAVIS

OFFICERS OF THE ASSOCIATION 1930-1931

President—Merle Prunty, Superintendent of Schools, Tulsa, Oklahoma
First Vice-President—C. R. Maxwell, Dean, College of Education, University of Wyoming, Laramie, Wyoming
Second Vice-President—G. W. Willett, Principal, Lyons Township High School, La Grange, Illinois
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L. N. McWhorter, Assistant Superintendent of Schools, Minneapolis, Minnesota
W. P. Morgan, President, Western Illinois State Teachers College, Macomb, Illinois
W. E. Tower, District Superintendent of Senior High Schools, Chicago, Illinois
J. M. Wood, President, Stephens College, Columbia, Missouri
The President, the Secretary, and the Treasurer are Members Ex-Officio

COMMISSIONS OF THE ASSOCIATION

Commission on Secondary Schools

Chairman—L. N. McWhorter, Assistant Superintendent of Schools, Minneapolis, Minnesota
Secretary—H. G. Hotz, Professor of Education, University of Arkansas, Fayetteville, Arkansas

Commission on Institutions of Higher Education

Chairman—H. M. Gage, President, Coe College, Cedar Rapids, Iowa
Vice-Chairman—C. S. Boucher, Dean, College of Arts, Literature, and Science, University of Chicago, Chicago, Illinois
Secretary—George F. Zook, President, University of Akron, Akron, Ohio

Commission on Unit Courses and Curricula

Chairman—Thomas M. Deam, Assistant Superintendent of Joliet Township High School and Junior College, Joliet, Illinois
Secretary—Will French, Associate Superintendent of Schools, Tulsa, Oklahoma

THE ANNUAL MEETING

The annual meeting of the Association is set for March 17-20, 1931, and, as usual, will be held in Chicago. Headquarters will be at the Stevens Hotel. Reduced railway rates will be available from all sections of the North Central territory and members are urged to provide themselves with certificates. The complete preliminary program for the meeting will be found elsewhere in this issue.

EDWARD L. HARRIS

One by one the early leaders in the North Central Association are passing on to their final rewards. Among the latest of these men to go is Edward L. Harris who died in Cleveland, Ohio, the last week in October, 1930.

Dr. Harris was actively connected with the Cleveland schools for forty-two years, the greater portion of the time being principal of the Central High School. He was perhaps the outstanding man representing the secondary schools during the early history of the Association. At his death he was nearly seventy-eight years of age.

FREDERICK L. BLISS

The older members of the Association will well remember the services formerly rendered by Dr. Frederick L. Bliss of Detroit and Jackson, Michigan, and will regret to learn that he passed away at his home in Jackson on Saturday, January 24. He was seventy-six years of age.

Dr. Bliss was the founder of the Detroit University School and for years previous was principal of the Central High School in Detroit. In 1914 he returned to his native city, Jackson, Michigan, and was principal of the Central High School there until near the time of his death.

USING THE QUARTERLY FOR EDUCATIONAL PURPOSES

The following excerpts from a letter recently received in the Editorial office from one of the Association's leaders are very suggestive. The ideas are passed on to other readers of our magazine.

"Recently I placed a file of *The North Central Association Quarterly* in the high school library and suggested to the members of our faculty that I should like to have them go over these quarterlies and give me a critique of those portions in which they were particularly interested. Almost every member of the faculty agreed to do this and I have now received three such critiques. I have not had a chance to read them but have put them away to read at one sitting when they have all come in."

THE NEXT ISSUE

By the time the March Quarterly is off the press the Managing Editor will be cruising in the Mediterranean Sea. After the cruise itself is over he expects to spend a month or so in France, Switzerland and England. Consequently the preparation of the June Quarterly will have to be undertaken by others than himself. Happily, the office assistant of the Editor, Miss Flora Schieferstein, is sufficiently conversant with the editorial duties to assume much of the responsibility for the June issue. Secretary Edmonson will, however, assume supervisvisory charge of the work. Here is believing that the June Quarterly will be the best one of all time.

REPRINTS

This issue of the Quarterly carries again some valuable curriculum materials. Reprints of this material will be made and will be furnished to schools as long as they last. The prices of these reprints are as follows:

	Each
English (3 reports combined)	$ .25
College Entrance Requirements in English	.20
Physics	.20
Chemistry	.15
Biology	.15

Address letter to the North Central Association Quarterly, 1439 University Elementary School, Ann Arbor, Michigan.

CURRICULUM STUDIES

The Commission on Unit Courses and Curricula has, for more than ten years, had a Committee on Standards for Use in the Reorganization of Secondary School Curricula. This Committee has turned out an enormous amount of material bearing on the subject of educational reforms. Some of this appeared before the Quarterly was started and is to be found in various numbers of the Proceedings. However, in the five years since the Quarterly has been printed this Committee has furnished at least twenty-five studies of a curriculum kind. These might properly be listed as *Opera*. The present issue of the *Quarterly* contains four of these works. The complete list is as follows:

In March, 1927

1. The General Report—First Form
2. Report of the Sub-Committee on English
3. Report of the Sub-Committee on French
4. Report of the Sub-Committee on Latin
5. Report of the Sub-Committee on General Science
6. Report of the Sub-Committee on Biology
7. Report of the Sub-Committee on Physics
8. Report of the Sub-Committee on Chemistry
9. Report of the Sub-Committee on Home Economics
10. Report of the Sub-Committee on Physical Education

In March, 1928

11. The General Report—Second Form
12. Report of the Sub-Committee on Mathematics
13. Report of the Sub-Committee on Spanish and German
14. Report of the Sub-Committee on Agronomy
15. Report of the Sub-Committee on Art
16. Report of the Sub-Committee on Music
17. Report of the Sub-Committee on Social Studies

In March, 1929

18. Report of the Sub-Committee on Extra-Curricular Activities
19. Quantitative Standards for Physics Teaching Units I-V

In September, 1929

20. Applying N. C. A. Standards to Courses in Latin
21. Applying N. C. A. Standards to Courses in English
22. Applying N. C. A. Standards to Courses in Music
23. The Reorganization of Physics

In September, 1930

24. Teaching Units in Physics—VI-XIX

In December, 1930

25. The Teaching of Biology
26. Report of the Sub-Committee on General Science

In March, 1931

27. Additional Studies Relating to Physics
28. Teaching Units in Biology
29. The Course in High School Chemistry
30. English: a. A Qualitative and Quantitative Unit in Lyric Poetry
    b. Units in English Correlated with Vocational Guidance
    c. Three Units in American Life as Interpreted in American Literature

PRELIMINARY PROGRAM

THIRTY-SIXTH ANNUAL MEETING

OF THE

North Central Association of Colleges and Secondary Schools

TUESDAY, WEDNESDAY, THURSDAY, FRIDAY

MARCH 17, 18, 19, 20, 1931

CHICAGO, ILLINOIS

HEADQUARTERS: STEVENS HOTEL

PROGRAMS OF THE COMMISSIONS

TUESDAY, MARCH 17

9:00 A. M. Commission on Institutions of Higher Education

PRIVATE DINING ROOM NO. 2

1. Executive Session—Board of Review.
   Consideration of applications for accrediting.
   President Gage, Dean Boucher, President Zook, Dean Effinger, Principal Buck, President Morgan, Reverend Dr. Cunningham.
   Open only to those whose applications for accrediting are being considered.

9:00 A. M. Commission on Secondary Schools

SOUTH BALLROOM

1. Registration.
2. Announcements:
   a. Chairman
   b. Secretary
   c. Chairman of Committee on Standards
   (Questions and Discussion)
   Recess
3. Work of Reviewing Committees starts:
   a. Committee on New Schools
   b. Committee on Schools Unqualifiedly Recommended
   c. Committee on Schools to be Warned or Advised
   d. Committee on Schools to be Dropped

TUESDAY, MARCH 17

2:00 P. M. Commission on Institutions of Higher Education

PRIVATE DINING ROOM NO. 2

1. Executive Session—Board of Review.
2. Meetings of Special Committees of the Commission.

8:00 P. M. Executive Session—Board of Review.
If necessary an evening session of the Board of Review will be held to consider cases of accrediting.

2:00 P. M. Commission on Secondary Schools

SOUTH BALLROOM

Continuation of Work of Reviewing Committees.
6:00 or 8:00 P. M. Meetings of Standing and Special Committees.

WEDNESDAY, MARCH 18

9:00 A. M. Commission on Institutions of Higher Education

NORTH BALLROOM

Meeting—Members of the Commission.

1. Roll Call.
2. Outline of Program and Procedure. The Chairman.
3. Report of the Secretary of the Commission.
4. Reports of Special Committees of the Commission:
   a. Committee on College Entrance Requirements in English.
      R. L. Lyman, Professor of the Teaching of English, University of Chicago, Chairman.
   b. Committee on College Faculties.
      W. E. Smyser, Dean, Ohio Wesleyan University, Delaware, Chairman. M. E. Haggerty, Dean, College of Education, University of Minnesota, Minneapolis, Secretary.
   c. Committee on Junior College Accrediting.
      L. V. Koos, Professor of Education, University of Chicago, Chairman.
   d. Committee on Library Standards.
      Douglas Waples, Professor, Graduate Library School, University of Chicago, Chairman.
   e. Committee on Music and Art Schools.
      A. H. Upham, President, Miami University, Oxford, Ohio, Chairman.

8:30 A. M. Commission on Secondary Schools

SOUTH BALLROOM

1. 8:30-9:30. Final Meeting of Reviewing Committees.
2. Reports:
   a. Committees
   b. Secretary
3. Election of Officers
4. Miscellaneous Business

9:00 A. M. Commission on Unit Courses and Curricula

NORTH ASSEMBLY ROOM

1. Reading of the Minutes of the Last Meeting. The Secretary.

WEDNESDAY, MARCH 18

2. Report of the Committee on Standards for Use in the Reorganization of Secondary School Curricula.
   L. W. Webb, Professor of Education, Northwestern University, Evanston, Illinois, Chairman.
   a. Report of the Sub-Committee in English.
      R. L. Lyman, Professor of the Teaching of English, University of Chicago.
   b. Report of the Sub-Committee in Music.
      L. W. Webb, Northwestern University.
   c. Report of the Sub-Committee in Art.
      W. G. Whitford, Professor of Art Education, University of Chicago.
   d. Report of the Sub-Committee in Physics.
      A. W. Hurd, Associate, Institute of School Experimentation, Columbia University.
   e. Report of the Sub-Committee in Biology.
      E. R. Downing, Professor of the Teaching of Science, University of Chicago.
3. Appointment of Nominating Committee.

2:00 P. M. Commission on Institutions of Higher Education

NORTH BALLROOM

1. Roll Call.
2. Report of the Board of Review. George F. Zook, Secretary.
3. Recommendation to the Executive Committee of the Association of Institutions to be Accredited.
4. Reports of Special Committees of the Commission, Continued:
   f. Committee on Physical Education and Athletics.
      H. M. Gage, President Coe College, Cedar Rapids, Iowa, Chairman.
   g. Committee on Reports to High Schools.
      C. S. Boucher, Dean, College of Arts, Literature, and Science, University of Chicago, Chairman.
   h. Committee on Supplementary Admission Reports.
      Ira M. Smith, Registrar, University of Michigan, Ann Arbor, Chairman.
5. The Corporate Colleges of St. Louis University.
   The Reverend Alphonse M. Schwitalla, S. J., Dean, School of Medicine, St. Louis, University.

2:00 P. M. Commission on Secondary Schools

SOUTH BALLROOM

1. Reports of Standing Committees:
   a. Committee on Blanks.
      J. W. Diefendorf, High School Visitor, University of New Mexico, Albuquerque, Chairman.
   b. Committee on Special Studies.
      C. R. Maxwell, Dean, College of Education, University of Wyoming, Laramie, Chairman.

WEDNESDAY, MARCH 18

2. Reports of Special Committees:
   a. Committee on Library.
      E. L. Miller, Assistant Superintendent of Schools, Detroit, Michigan, Chairman.
   b. Committee on Majors and Minors.
      George C. Wells, Secretary, Oklahoma State Board of Education, Oklahoma City, Chairman.
      (Discussion)

6:30 P. M. Annual Dinner of the Commission.
Theater Parties.

1:30 P. M. Commission on Unit Courses and Curricula

NORTH ASSEMBLY ROOM

1. The Relation of Units Taken in High School Subject Fields to College Marks.
   Harl R. Douglass, Professor of Education, University of Minnesota, Minneapolis.
2. Economy of Time Within Subject Fields.
   G. W. Willett, Principal, Lyons Township High School and Junior College, La Grange, Illinois.
3. The Work of the National Survey Committee on Secondary Education as it Pertains to Curriculum Organization and Development.
   L. V. Koos, Professor of Education, University of Chicago.
4. Report of the Nominating Committee.

THURSDAY, MARCH 19

9:00 A. M. Commission on Institutions of Higher Education

NORTH BALLROOM

1. Roll Call.
2. Reports of Special Committees of the Commission, Continued:
   i. Committees in Charge of Supervising Various Experiments Approved by the Commission.
   j. Committee on Revision of Standards.
      L. D. Coffman, President, University of Minnesota, Minneapolis.
3. Address. Principles Which Should Govern Standards and Accrediting Practices.
   S. P. Capen, Chancellor, University of Buffalo.
4. Election of Officers.

9:00 A. M. Commission on Secondary Schools

SOUTH BALLROOM

1. Reports of Special Committees, Continued:
   c. Committee on Athletics.
      E. E. Morley, Principal of High School, Cleveland Heights, Ohio.
2. Reports of Joint Committees:
   a. Committee on College Entrance Blanks.
   b. Committee on Junior College Accrediting.
   c. Committee on the Tulsa, Oklahoma, High School Educational Experiment.
      (Discussion)
3. A Report on the National Survey of Secondary Education.
4. Announcements of Committee on Standards.
5. Unfinished Business.
6. Adjournment.

THURSDAY, MARCH 19

9:00 A. M. Commission on Unit Courses and Curricula

NORTH ASSEMBLY ROOM

1. Report of the Committee on College Entrance Requirements in English.
   E. L. Miller, Assistant Superintendent of Schools, Detroit, Michigan.
2. Reorganization of the Curricula on the Basis of the Objectives Set up by the North Central Association.
   J. E. Stout, Dean, School of Education, Northwestern University, Evanston, Illinois.
3. What Should Be the Policy Governing the Future Activities of the Commission.
   H. H. Ryan, Principal, The Wisconsin High School, University of Wisconsin, Madison.

PROGRAM OF THE GENERAL ASSOCIATION

PRESIDING OFFICER—MERLE PRUNTY, SUPERINTENDENT OF SCHOOLS, TULSA, OKLAHOMA

THURSDAY, MARCH 19

2:00 P. M. Program in Charge of the Commission on Unit Courses and Curricula

GRAND BALLROOM

1. A Second Report of the Committee on College Entrance Requirements in English.
   E. L. Miller, Assistant Superintendent of Schools, Detroit, Michigan.
2. Report of the Committee on Standards for Use in the Reorganization of Secondary School Curricula.
   L. W. Webb, Professor of Education, Northwestern University, Evanston, Illinois.
3. Unit Organization of Teaching Material in English.
   R. L. Lyman, Professor of the Teaching of English, University of Chicago.

3:30 P. M. Business Meeting

4. Appointments of Committees. Mr. Prunty (President).
5. Report of the Executive Committee. Mr. Edmonson (Secretary).
6. Report of the Treasurer. Mr. McComb.
7. Report of the Special Committee of the Executive Committee on the Teacher-Training Survey.
   M. E. Haggerty, Dean, College of Education, University of Minnesota, Minneapolis.

4:30 P. M.

8. Report of the National Advisory Committee on Education.
   L. D. Coffman, President, University of Minnesota, Minneapolis.

THURSDAY, MARCH 19

6:00 P. M. Banquet

NORTH BALLROOM

(Tickets may be secured at the Secretary's Desk in Private Dining Room No. 3, Stevens Hotel.)

1. Greetings from Fraternal Delegates from Other Regional Standardizing Agencies.
   Harry D. Campbell, Dean, Washington and Lee University, Lexington, Virginia. Association of Colleges and Secondary Schools of the Southern States.
   Howard Conant, Principal of High School, Holyoke, Massachusetts. New England Association of Colleges and Secondary Schools.
   Henry G. Doyle, Dean, Junior College of George Washington University, Washington, D. C. Association of Colleges and Secondary Schools of the Middle States and Maryland.
2. Address. Merle Prunty, President of the North Central Association of Colleges and Secondary Schools.
3. Address. Robert M. Hutchins, President, The University of Chicago.

FRIDAY, MARCH 20

9:00 A. M. Program in Charge of the Commission on Institutions of Higher Education

GRAND BALLROOM

1. Report of the Commission on Institutions of Higher Education.
   George F. Zook, Secretary.

10:30 A. M.

2. Committee on Time and Place.
3. Committee on Nominations.
4. Report of Delegate to the American Council on Education.
   Charles H. Judd, Director, School of Education, University of Chicago.
5. Address—The Experience of Colorado State Teachers College with New Entrance Requirements.
   G. W. Frasier, President, Colorado State Teachers College, Greeley.

FRIDAY, MARCH 20

2:00 P. M. Program in Charge of the Commission on Secondary Schools

GRAND BALLROOM

1. Report of Business Transacted by the Commission.
   H. G. Hotz, Secretary.

3:30 P. M.

2. Address—Trends in Higher Education.
   H. W. Chase, President, University of Illinois, Urbana.
3. Miscellaneous Business.

Constitution

(Revised and Adopted March 15, 1928)

ARTICLE I

NAME

The name of this Association shall be the North Central Association of Colleges and Secondary Schools.

ARTICLE II

OBJECT

The object of the Association shall be to establish closer relations between the secondary schools and the institutions of higher education within the North Central States and such other territory as the Association may recognize.

All decisions of the Association bearing on the policy and management of secondary schools and institutions of higher education are understood to be advisory in their character.

ARTICLE III

MEMBERSHIP

Section 1. The membership of the Association shall consist of three classes: First, secondary schools and institutions of higher education; second, officers of the Association and members of the Commissions; and third, honorary members.

Section 2. Any secondary school or institution of higher education which has been approved by the Association shall be admitted to membership on the payment of the annual dues. Such membership shall cease, if, at any time, the secondary school or institution of higher education is dropped from the approved list of the Association or if the annual dues are more than one year in arrears.

Section 3. Honorary members shall be elected on the nomination of the Executive Committee and confirmation by a two-thirds vote of all the members present and voting at any regular meeting. All persons holding individual membership prior to the annual meeting, March 20 and 21, 1925, shall thereafter be honorary members.

Section 4. All individuals holding membership on Commissions of the Association or serving as elected officers of the Association shall be members of the Association with full powers except as limited by Section 5 of Article III.

Section 5. Any person engaged in the work of teaching or administration in a secondary school or institution of higher education which holds membership in the Association shall have the right to attend meetings and participate in the activities of the Association; but a secondary school or institution of higher education holding membership shall have only one vote on any question before the Association, such vote to be cast by the executive head of the secondary school or institution of higher education or by some person designated by him in credentials addressed to the Secretary.

Section 6. Honorary members shall receive the publication of the Association and have all the privileges of membership in the Association except voting, provided that this clause shall not impair the right to vote of those persons who were honorary members of the Association prior to March 1, 1928.

Section 7. Honorary members, officers of the Association, and members of the Commissions shall not be required to pay dues, as hereinafter defined.

ARTICLE IV

OFFICERS AND COMMITTEES

Section 1. The officers of the Association shall be a President, Two Vice-Presidents, a Secretary, and a Treasurer. The President and two Vice-Presidents shall be elected at the annual meeting of the Association for a single term of one year or until their successors are elected. The Secretary and the Treasurer shall be appointed by the Execu-

tive Committee and shall serve without compensation.

Section 2. There shall be an Executive Committee, a Commission on Institutions of Higher Education, a Commission on Secondary Schools, and a Commission on Unit Courses and Curricula, constituted as hereinafter defined.

Section 3. The Executive Committee of the Association shall consist of the President, the President of the next preceding year, the Secretary, the Treasurer, four additional members two of whom shall be elected each year by the Association for a term of two years, and the chairman of each of the Commissions provided for in Section 2. (Two of the four members of the Executive Committee elected in 1928 shall be selected for the term of one year.) The Executive Committee shall receive and report the list of members. It shall receive the approved lists prepared by the Commission on Institutions of Higher Education and the Commission on Secondary Schools, shall pass on these lists, and shall cause them to be published. The Executive Committee shall have final authority to hear and determine appeals, if any, against the findings of these Commissions in the approval of schools. It shall nominate members of the various Commissions as hereinafter provided subject to election by the Association. It shall fix the time and place of meetings not otherwise provided for; shall prepare the program for the annual meeting; shall provide for the publication of reports and proceedings; shall fill vacancies in the list of officers, and shall transact any necessary business when the Association is not in session.

The Executive Committee shall have the power to authorize and approve all expenditures of funds and each Commission shall submit to it a budget of proposed expenditures. The Executive Committee shall submit a detailed report of income and expenditures at each annual meeting. This report of the Executive Committee shall be referred to an auditing committee appointed by the President.

All the acts of the Executive Committee shall be subject to revision by the Association except where the Executive Committee has been given final authority.

Section 4. The Commission on Institutions of Higher Education shall consist of forty-eight persons representing the members of the Association, thirty from the institutions of higher education and eighteen from the secondary schools. These shall be elected for a period of three years, ten members of the first group, and six of the second to be elected annually.

This Commission shall prepare a statement of the standards to be met by institutions of higher education seeking the approval of the Association, which standards shall be submitted by the Executive Committee to the Association for approval or rejection; shall receive and consider statements made by institutions within this territory seeking to be approved by the Association; shall provide such inspections as it deems necessary; shall prepare lists of institutions which conform to the standards prescribed; and shall submit lists to the Executive Committee for final approval and publication. This Commission may, with the approval of the Executive Committee, grant an institution of higher education the freedom to waive certain standards in order that the institution may carry on an educational experiment that the Commission has approved.

Section 5. The Commission on Secondary Schools shall consist of (a) the high school inspector or corresponding officer for the state university in each state within the territory of the Association; or, in case there is no such officer, some member of its faculty designated by the state university; (b) the inspector of high schools, if any, of the state department of public instruction in each state within the territory of the Association; (c) a principal of a secondary school accredited by the Association, to be elected by the Association on the nomination of the Executive Committee for a period of three years, one-third of the number to be elected each year; and (d) eighteen other persons to be elected by

the Association on the nomination of the Executive Committee for a period of three years, one-third of the number to be elected each year.

This Commission shall prepare a statement of the standards to be met by secondary schools seeking approval by the Association which standards shall be submitted by the Executive Committee to the Association for approval or rejection. This Commission shall make such inspection of schools as it deems necessary, shall prepare lists of the secondary schools within the territory of the Association which conform to the standards prescribed, and shall submit these lists to the Executive Committee for final approval and publication. This Commission may, with the approval of the Executive Committee, grant a secondary school the freedom to waive certain standards for approval in order that the school may carry on an educational experiment that the Commission has approved.

Section 6. The Commission on Unit Courses and Curricula shall consist of twenty-four persons, twelve representing the institutions of higher education and twelve the secondary schools, members of the Association, four of each group to be elected annually for a period of three years on the nomination of the Executive Committee.

This Commission shall plan and carry forward research relating to unit courses of study in various subjects and the curriculum in all classes of secondary schools and institutions of higher education included within the Association.

Section 7. The Commissions herein provided for shall elect their own officers, one of whom shall be designated the chairman.

Section 8. Prior to each annual meeting of the Association the President shall appoint a committee of five whose duty it shall be to nominate suitable persons for election to each office not otherwise provided by the Association. The announcement of these nominations shall be made at the first session of the Association, but elections shall take place at a later session. Independent nominations may be made upon petition by any ten members.

ARTICLE V

MEETINGS

There shall be an annual meeting of the Association at such time and place as may be determined by the Association and such special meetings as the Association or the Executive Committee may appoint.

ARTICLE VI

FEES

To meet the expenses of the Association, an annual fee shall be paid by each member, the amount to be determined by the Association on the recommendation of the Executive Committee.

ARTICLE VII

QUORUM

At any meeting in accordance with provision of Article V, fifty voting members of the Association shall constitute a quorum.

ARTICLE VIII

AMENDMENTS

This constitution may be amended by a three-fourths vote at any regular meeting, provided that a printed notice of the proposed amendments be sent to each member two weeks before said meeting.

ARTICLE IX

PARLIAMENTARY RULES

The rules contained in Robert's Rules of Order Revised shall govern the meetings of the Association and of the Commissions in all matters to which they are applicable, and in which they are not inconsistent with this Constitution or the rules of the several bodies involved.

Teaching Units in Biology—An Investigation[1]

(A Committee Report)

By ELLIOT R. DOWNING,
University of Chicago

Early in the autumn of 1928 letters were sent to fifty teachers of biology in the high schools of Illinois, Indiana, Michigan and Wisconsin, asking them to co-operate in such a study as this. Two expressed a willingness to do so. It was evident that teachers hesitated to introduce such teaching material unless requested to do so by their principals or superintendents.

In the late summer of 1929 letters were sent to 131 superintendents of schools or high school principals in average sized to small cities in the same four states, 43 in Illinois, 26 in Indiana, 34 in Michigan and 28 in Wisconsin. Copy of the letter sent out is attached to this report and lettered A. Fifty of these supervising officers replied that they would request their teachers of biology to co-operate. 18 in Illinois, 10 in Indiana, 7 in Michigan, and 15 in Wisconsin.

To the teacher of biology in each of the fifty schools promising co-operation a letter B was sent together with detailed outlines of the four units C, D, E, F. Copies of these are attached. The purpose of the study was explained in the letter and it was further stated that each unit was organized to secure on the part of the pupils an understanding of one important principle or a group of closely related principles—such an understanding as would enable them to apply the principle to problematic situations likely to occur in life. The teacher's attention was called to problems of this type, given for drill, in the unit outlines and she was informed that the tests to be furnished would include such problems. It was explained that teaching to the point of mastery meant developing in pupils such a grip on the principle that he could apply it.

The teacher was requested to notify me when any unit was completed by her class. Then enough mimeographed copies of the test for the unit were sent her so that each pupil could have one. Copies of these tests for the four units are attached, and also the accompanying letter, G, H, I, J, K. After the pupils had taken the test the papers were returned to me and I corrected and scored them, 1079 papers in all. A report was sent to the teacher giving the average and median score of the class and the number of errors made on each part of each question. It was hoped that teachers would reteach the units to try and secure mastery in the cases where tests showed low scores but in no case was this done.

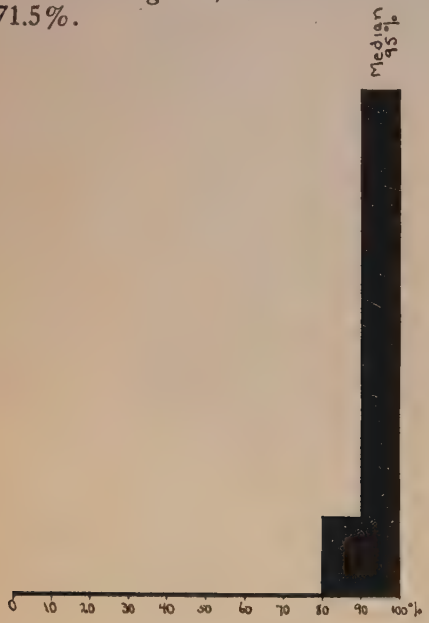
When the test papers were sent me the teacher reported the time in minutes spent by her class in the study of the particular unit. Only seventeen schools out of fifty fulfilled their promise and of these fourteen taught only one unit; three, two units; and one school Viroqua, Wisconsin, taught all four units.

While the data from the study are disappointingly meager they do, I believe, give a fairly satisfactory answer to the question which prompted this investigation.

A graph showing the scores made by the pupils in a given unit shows quite clearly whether or not mastery has been achieved. There is presented here a graph of the scores made by pupils in Elgin, Illinois, on unit No. 1 where mastery was achieved, and a graph from an-

[1]This is a Report of an Investigation to Determine the Time Required to Teach Certain Units in Biology to the Point of Mastery. It was presented to the Curriculum Committee of the North Central Association of Colleges and Secondary Schools, and by them ordered printed. See page 442 for price of reprints of this article.—The Editor.

other school on unit No. 1 in which mastery was not achieved, Fig. 1 and 2. The median score in the first case is 95% and the average, 94.07%. In the latter case the median is 57%; the average, 48.8%. Similar graphs, Fig. 3 and 4, are shown for the grades of pupils on unit No. 3 at Viroqua, Wisconsin, where the mastery is fairly complete, the median score being 93%; the average, 88.4%, and for a second school where the mastery is evidently incomplete, the median being 75% and the average 71.5%.



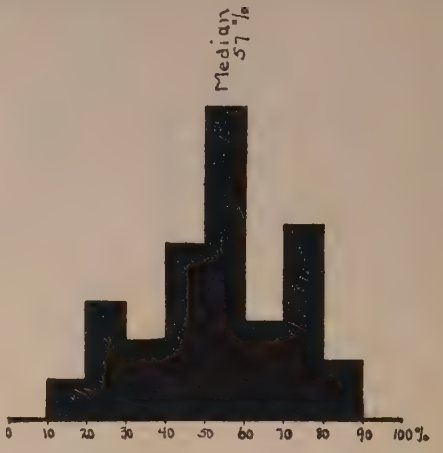
Scores of 30 pupils on unit I, Elgin high school.

Figure 1

It will be noted that the graphs showing incomplete mastery are much more like the old curves that we have commonly called the normal distribution curves. It is very evident that when the unit is taught to the point of mastery the curve is of a very different order.

The average number of errors per pupil also gives good evidence of the completeness of mastery. There are twenty possible errors for the test on unit No. 1. The average number of errors per pupil in the papers from Elgin is .77, in the papers from the second school whose graph is shown for unit No. 1, 4.7. Of the twelve schools that completed unit No. 1 no school approaches Elgin very closely in the matter of mastery. The errors per pupil range from 1.8 to 4.9.

The time employed at Elgin in instruction on this unit was 450 minutes—about



Scores of 55 pupils on unit I, another school

Figure 2

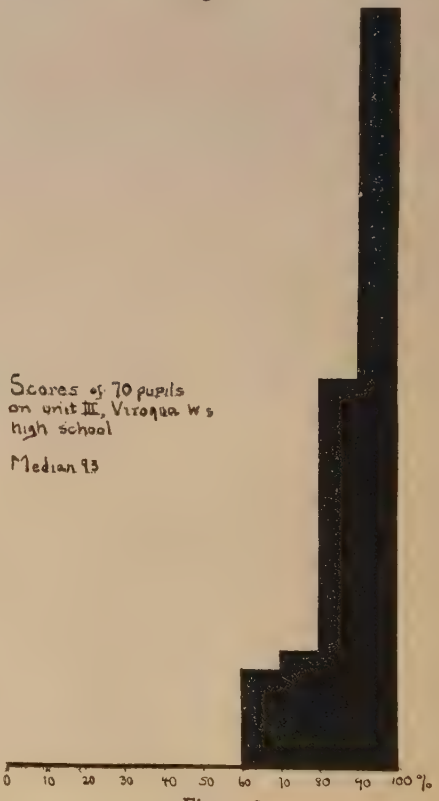
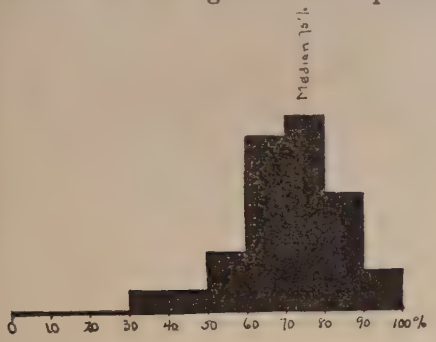


Figure 3

two weeks. Other schools employed considerably more time and yet did not achieve mastery. For instance, one that used 840 minutes has an average grade of 61.1%; another school achieved 65.3% average with only 315 minutes used. The average time spent on this unit in all the schools except Elgin was in round numbers 600 minutes. None of them achieved anything like complete mastery. It is very evident therefore that it is only the exceptional teacher working under exceptional conditions who can give her class mastery in 450 minutes, and the time required for this unit in the average school is probably



Scores of 32 pupils on unit III another high school

Figure 4

double this; that is, from 3 to 4 weeks.

Such evidence as is in hand shows apparently that unit No. 2 requires about the same time; unit No. 3 somewhat less —perhaps 300 or 400 minutes; but unit No. 4, considerably more—probably not less than six to eight weeks.

We may then, I think, conclude that to teach a principle of biology so that it will function in life situations requires somewhere in the neighborhood of four weeks in which case it is evident that we may not teach more than eight or nine such in the course of a year's work and not even that many if we are going to try to give skill in scientific thinking and establish any of the desirable emotionalized standards.

The most striking feature of this study is the apparent inability of most teachers of high school science to give pupils mastery of a principle. Really only 4 schools out of the 17 that co-operated show mastery curves when the grades of the pupils on the test given were plotted. That the type of test used is not too difficult for high school biology classes is evident from the success of these few schools. Teachers were informed in the instructions sent them that mastery of the principle, that is, ability to apply it to the solution of problematic situations, was regarded as the important outcome of each unit and that the tests would consist largely of such problems, samples of which were provided in the units so pupils could be drilled upon their solution.

One who is familiar with the instructions being given biology classes and the text books used knows that pupils are held to the memorization of a mass of detailed facts largely unorganized and insignificant. Science is organized knowledge and without the organization about principles the facts taught are soon forgotten. High school pupils confronted with a problem to solve seem quite helpless for they have had, as a rule, no drill in such application of the science studied nor in scientific thinking so essential in problem solving.

For this condition the college is in no small measure responsible.

(1) 90% and more of college entrance examinations in science consists of questions that necessitate merely the recall of facts. Rarely do they demand knowledge of principles and almost never the ability to apply principles to real problematic situations. Thus, high school teachers are stimulated to teach a mess of useless facts, useless except as a means of passing the inane college entrance tests.

(2) College science classes, even teachers college classes are taught science to prepare for research—the producer science—not to prepare for the use of science in life—the consumer science. High school science pupils do not need a survey of the field of each science but do need a working knowledge of the most important principles of science—most important because they are the principles most frequently needed in solving life's problems.

(3) These college graduates go out to teach science in the high schools and teach the only science they know, that which has been taught them, and in the way it has been taught them. This is largely by the laboratory method, when abundant research has shown the greater efficiency, for secondary school level, of the demonstration method. Such teachers, fresh from college, try to give their high school pupils instruction covering the field of biology, presenting material that is beyond the grasp of pupils of adolescent age because it is too abstract, and giving no drill in the application to life.

This association which assumes as one of its tasks the intelligent adjustment of the relations between secondary schools and colleges could do much for effective science instruction in secondary schools if it would adopt the following principles of policy which are recommended to the committee to be passed on, with the committee's approval, to the association for adoption.

First, that college entrance examinations in science cease demanding the mere memorization of facts and demand ability to apply a few important principles of science to real life problems.

Second, that college science courses, at least those for teachers, be so formulated as to give not merely a knowledge of the most important principles of science but ability to apply them; that, in a word, the colleges provide consumer science and not just producer science.

Third, that colleges cease demanding of entrants from the high schools that science offered for admission shall have been done by the laboratory method, and accept science that has been taught by demonstration.

Fourth, that at high school level each science course should aim to give mastery of only a few—10 or 12—of the most important principles judged on the basis of life's needs, and much drill in their application to problematic situations.

Fifth, that both at college and at lower levels skill in scientific thinking be considered an important major goal in scientific instruction—quite as much as the acquisition of knowledge of science subject matter.

A

August 2, 1929

Dear Sir:

The Curriculum Committee of the North Central Association of Colleges and Secondary Schools has asked the Science Sub-Committee to conduct some special investigations this year. Accordingly, we are trying to find out how long it takes to teach certain teaching units in Biology or Botany and Zoology to the point of mastery. This must be done in order to tell how many such units can be put into a year's work. Mastery is accomplished when the pupils are able to solve problematic situations that involve the principle or group of principles taught in the unit.

The plan of operation is as follows: The chairman of the committee will send to those high schools willing to co-operate outlines of four units on topics that are usually taught in the Biology course. The Biology teacher, or Botany and Zoology teacher, will then follow as nearly as possible the outline sent in teaching these units. He will keep records of the time, in class periods, used to teach these units. A test on these units, uniform for all schools, will be sent the teacher when he notifies the chairman that he is ready to use it. These tests will be returned to the chairman as soon as completed, so that he may score them. The teacher may score them for his own records first, if he so desires.

If mastery has not been achieved, the committee would like to have the teacher reteach those parts of the unit which the test shows were not mastered, and report the additional time used. A second test will be sent then. This reteaching is not absolutely essential, and may be omitted if the time available for teaching is limited.

The committee tried to secure the co-operation of teachers of Biology early this year with small success. Apparently they felt that without instructions from their principal or

superintendent they were not at liberty to introduce such new materials in their work. The committee is therefore writing such supervisory officers to ask them to instruct their teacher or teachers of Biology to co-operate in this investigation. We should like to have these units on the cell, photo-synthesis and inheritance given as early in the course as possible, so the returns may be worked over in time for a report to the Association.

If your school will co-operate in this investigation, will you signify your willingness to do so. The outlines of the units will then be sent to you to be given to your teacher with any instructions that you may care to give in addition.

Yours very truly,

ELLIOT R. DOWNING.
The University of Chicago
The School of Education.

B

To the Teacher:—

Outlines of four teaching units accompany this sheet. They should be taught in this order: 1. Photosynthesis. 2. Why We Eat Sunshine. 3. The Cell Theory or the Workmen of Our Bodies. 4. Mendel's Laws or the Improvement of Plant, Animal, and Human Stock. If you can not teach all four, teach and report on as many as you can; even a report on one will be helpful.

The science curriculum committee of the North Central Association is trying to find out how long it takes to teach such units in order to determine how many may reasonably be included in a year's work in biology (or botany and zoology).

Mastery of the unit is accomplished when pupils can solve problems involving the principle (law) taught in the unit—such problems as those at the end of the unit on photosynthesis.

When you have taught a unit to your own satisfaction please notify the chairman of the committee who will send you a test made up largely of problems. The same test will be used for all co-operating schools. Please keep record of the time in class periods devoted to each unit. Send the test papers of your pupils to the chairman promptly, grading them first for your own records if you wish.

If the tests show that parts of the unit have not been mastered, reteach these when the chairman reports the defects to you and keep track of the time used in reteaching. This reteaching is not essential if your time for the unit is limited, but it will help the committee reach definite conclusions if it can be done.

The unit on "Why We Eat Sunshine" suggests an explanatory introduction or preview. Use it and similar ones of your own devising for other units if you wish. The work suggested in paragraph E of this unit will have been covered by the preceding unit on photosynthesis.

The experiments suggested may be done as demonstrations by the teacher or pupils or as individual laboratory work. Other equivalent experiments may be used if you are in the habit of using such. You may substitute for the suggested readings equivalents in other books. In general you need not follow these outlines slavishly. Make such changes as are needed to adapt them to your conditions but aim to give pupils a mastery of the principles.

Elliot R. Downing, Chairman
The University of Chicago
The School of Education
Chicago, Illinois.

C

There follows an instruction unit which for many will come under

The Vocational Ultimate Objective

Immediate Objective

A. Acquiring Fruitful Knowledge

1 (a) Necessary to undertake advanced technical or professional study:

For others it will come under

The Leisure Time Ultimate Objective

Immediate Objective

A. Acquiring Fruitful Knowledge

2 (g) Avocation—gardening

PHOTOSYNTHESIS AND RESPIRATION

Introductory

A week or ten days before this unit is to be introduced, set up the following experiment on the windowsill where it can have sunlight as much of the day as possible. Have the pupils note what happens in the apparatus from day to day. Demonstration I. Fill a clear battery jar or similar deep clear glass jar nearly full of water. Put in it a generous handful of clean Caboma, Myriophyllum or other vigorous submerged water plant. With a triangular file make a deep scratch on the stem of a large glass funnel near the flare of the funnel. Break off most of the stem by pressing with your thumbs, placed back to back, opposite the scratch. Put the funnel, mouth down, over much of the water plant, supporting the rim of the funnel on bits of stone or short lengths of funnel stem so the cut end of the stem on the funnel will be about an inch below the surface of the water. Submerge a good sized test tube in the water in the jar so it will fill with water completely. Without removing its mouth from the water, set it bottom up over the end of the funnel stem, this end to project into the mouth of the test tube a bit. Fasten the test tube in this position by a clamp attached to a ring stand set beside the glass jar.

Three or four days before the unit is to begin, set up this experiment. Demonstration II. Obtain two small potted plants like begonias or geraniums each in a pot small enough to slip into the mouth of a quart fruit jar. Or you can transplant two small weeds to waxed paper drinking cups for the experiment. Set two inch-lengths of a small Christmas tree candle each onto an inch square of cardboard, fastening each by a few drops of candle wax. Set each candle inside of a clean quart fruit jar on the bottom at one side of the jar. Fit the usual rubber about the mouth of each jar and have the tops ready to screw on. Set a potted plant in each jar so the foliage will not be over the candle. Light the candle in each jar with a match fastened on the end of a stick, and promptly screw on the cover. What happens to the candle flame? Set these jars on the winsill where the contained plants will get the sunlight.

The unit may now be introduced with these experiments that challenge attention and stimulate interest.

Preliminary statement. All persons are so familiar with the fact that trees, shrubs, grass and other growing plants are green, that the commonplaceness of it makes us ignore the very remarkable fact. Suppose we should wake up some morning to see all the foliage pink, what a changed world it would be! You may not want to be a "green" human being, but we should all promptly die if it were not for the green plants. If you were to go out in the garden and bury your feet in the soil, spread your arms out to the sunshine, you would soon get thirsty and hungry and in time die. How do the plants manage to live under such conditions?

What Is the Work of the Green Plants?

What Service Do They Render Us?

Completion of Demonstration I. What has been happening in the apparatus? The test tube is probably full or nearly full of a gas, bubbles of which have been coming off from the green leaves of the submerged plants. Cover the mouth of the test tube with the thumb or with a small piece of glass and hold it mouth up

in the hand. Light a splinter of wood and after it has burned a moment, blow out the flame leaving a glowing coal on the end of the stick. Introduce this into the test tube. What happens? What does this show? Following each demonstration have pupils write up each under four headings: 1. The purpose of the demonstration. 2. How the apparatus is set up. 3. What happens in the course of the experiment. 4. What the experiment shows. Quizz pupils often during the demonstration to make sure all understand the setup of the apparatus and are observing what happens.

If pupils are not familiar with oxygen gas and its properties, use this experiment. Demonstration III. Generate some oxygen and collect it in wide-mouthed bottles to observe its properties. Burn sulphur, picture wire, etc., in it to show that the gas supports combustion vigorously. See any elementary chemistry for directions.

Completion of Demonstration II. Loosen the cap on one of the quart jars. Introduce a lighted splinter of wood, sliding the cover to one side just enough to admit it. What does this show? Was there oxygen in the jar when the plant was left in it? Clean out this jar. Shake 10 cc. of limewater about in it and pour this limewater into a small beaker. Light a candle and let it burn at the bottom of the jar with the cover on the jar. After the flame has gone out, loosen the cover and slide it to one side so that 10 cc. of clear limewater may be poured in. Shake it about and then pour it out into another small beaker. Evidently the burning of the candle has generated some substance that renders the limewater milky. This substance is carbon dioxide, a product of the chemical union of the oxygen of the air with the carbon in the candle (or in the wood in the case of the burning wood splinter).

Test the other jar with the plant in it for this gas, CO_2. Was there CO_2 in this jar when we left the plant standing in it?

What are your conclusions now from Demonstrations I and II? (Insist that pupils state these for themselves. Ask leading questions if need be but do not tell pupils the answers. Make them see for themselves. Make sure their statements do not include more than the results justify.)

Before proceeding it will be necessary to give pupils some experiences (if they have not already had them) to clarify some concepts necessary in understanding what is to follow. It is already evident that the work carried on by plants is, in part at least, chemical in character. It is essential that the distinction between chemical and physical changes be made apparent.

Demonstration IV. Hold in the forceps one end of a strip of magnesium ribbon, four inches long. With a match light the other end, allowing the product to fall on a piece of paper. The ribbon burns with a brilliant light, too brilliant to look at directly with safety. Note the product of the burning, a greasy-feeling white powder. The magnesium was, on the contrary, an easily bent, yet fairly tough metal. Here a new substance has been produced by the union of the magnesium and the oxygen of the air—an oxide of magnesium. Its properties are quite unlike those of either of the substances that combined to produce it.

The chemist believes that each atom of magnesium combines with an atom of oxygen to form one molecule of magnesium oxide, MgO. When the sulphur was burned in the oxygen, one atom of sulphur combined with two atoms of oxygen to form sulphur dioxide, SO_2, a gas. This oxide of magnesium that has been made could be separated into smaller and smaller particles by physical means just as you could break a bit of chalk into smaller and smaller bits. But ultimately each molecule (the molecule is far too small to handle or even to see), if broken up by chemical means, would give magnesium and oxygen—substances quite unlike the magnesium oxide.

In this experiment (IV) the chemical action that went on to form MgO produced energy in the form of light and heat, but frequently energy is required to produce the chemical change and is stored up in the compounds formed and

liberated when the compound breaks down.

Demonstration V. (a) Grind up in a mortar a quarter of a loaf of loaf sugar into a fine powder. Dust out the mortar thoroughly. Grind up similarly the same quantity of potassium chlorate. Mix half of each of the powders together, by rolling them about together on a piece of paper as its edges are lifted first at one point, then at another. (If mixed in a manner to cause much friction, the mixture may explode.) Put the mixture on a brick or on an old plate. Drop on the pile a drop of sulphuric acid from a medicine dropper. The rapid chemical action with the production of heat and light is due in part to the decomposition of the sugar and potassium chlorate, in part to the reunion of the chemical substances produced by decomposition, especially the union of the oxygen from the potassium chlorate with the carbon and hydrogen of the sugar. (What experience have you had that leads you to know that there is carbon in sugar?)

(b) Nearly fill a 100 cc. beaker with a strong sugar solution and add to it a quarter of a yeast cake broken into little bits. Let it stand for a day or two, when fermentation will go on. The sugar is broken down and carbon dioxide gas is given off. Take the temperature of the fermenting material; it will be found to be higher than that of the surrounding air. The energy produced as heat by decomposition is not confused in this case with that of recombinations.

Physical energy may be stored in a like manner. Lift a block from the floor to the table, and the block has stored in itself the energy expended to lift it to the table. Shove it off from the table and the energy again becomes active, the block striking the floor with a force equal to that required to lift it. The weight on the pile driver stores energy as it is hoisted and expends it in driving the pile when it falls on the top of the pile. Read in some good text book of physics on the subject of kinetic and potential energy and learn of other cases in which energy is stored as potential energy.

We have seen that a green plant in the sunlight takes in CO_2. It takes in other things as well.

Demonstration VI. Fit a cork to the neck of a long-necked bottle or flask. Cut it in half and file out a groove in each half, so as to form a hole that will receive the stem of a plant. Fill the flask nearly full of water. Root out a nasturtium plant or a small geranium with several leaves; wash off the soil from the roots and set it in the flask, the stem held by the cork, the roots in the water. A twig of cottonwood or other tree may serve in place of the small plant. Put it into the water immediately when it is cut off the tree. See that the cork fits tightly and that water cannot escape where the plant stem emerges from the cork. (Seal with paraffin if necessary.) Mark the level of the water in the neck of the flask. Let it stand for several days and mark again. Measure the volume of water that has gone from the flask. Measure roughly in square centimeters the several leaves on the twig or plant. Estimate the number of leaves on a good-sized tree. How much water would it transpire daily? State the results of your estimate.

Demonstration VII. Inclose the pot of a small potted nasturtium, freshly watered, in sheet rubber (dentist's rubber) or paraffined paper, fastening the rubber snugly around the stem of the plant with a cord. Weigh it, rubber and all, at once. Let it stand for several days and weigh again. What does this experiment show that the foregoing one did not? Compare the results with the results of the above. Record.

Demonstration VIII. Mount a strip of the epidermis peeled from the under side of the leaf of Wandering Jew or other similar leaf in a drop of water on a slide and cover with a cover glass. Project this on the screen with the projection microscope or show it under a microscope. Have pupils draw it to show stomata. Consult books to find some estimate of the number of stomata to a square centimeter of leaf surface.

Demonstration IX. Show pupils a cross-section of a leaf of the rubber

plant or similar leaf under the microscope or with the projection microscope. Have them make a diagramatic drawing to show upper epidermis, palisade tissue, parenchyma, lower epidermis with its stomata.

Demonstration X. Add a teaspoonful of red ink to a half tumbler of water. Put in it a stalk of celery and a white carnation on a short stem. Let stand for twenty-four hours. What happens? Cut open the celery stalk. This shows two things: (1) that fluids are conducted in the stem along the ...., (2) that not only water but substances ..... are carried up to the leaves. (How is the red ink made?) This same thing may be shown with a leaf of common plantain or a begonia leaf, though it is plainer in the blanched plants where the green coloring matter does not obscure the result.

We have seen in the demonstrations above that water is given off constantly by the leaves of the plants, passing to them through the stems from the roots. The following experiment will show the delicate root hairs that absorb this water from the soil.

Demonstration XI. Scatter some radish seeds on the surface of moist earth in a flower pot. Cover with a piece of glass and watch them as they germinate. Draw a radish seedling to show the root hairs. Pick up a radish seedling, the root of which is well covered with root hairs. What comes up with it?

Demonstration XII. Put a little starch into a test tube, fill the latter one-quarter full of water and shake it. Add a drop of chloride of zinc solution; note the color. This is a characteristic test for starch. Cut the coat from a dry corn kernel and scrape, testing the scrapings with iodine in the same way. State your conclusion.

Demonstration XIII. Turn over boards or stones in the field to find a plant growing partly under the board, partly out in the light. What is the color of the covered-up portion? What is the usual color of all plant leaves? Do you know why? Take a blanched leaf and a green leaf from the plant you have found. Notch one so you can tell them apart. Put both into 70 per cent alcohol in a small covered dish for a few hours, until the green color is gone from the green leaf. Warm the alcohol if necessary. (Be careful; it burns readily.) Pour off the alcohol, wash with water, and stain with iodine solution. State your conclusion.

Demonstration XIV. Cut a willow twig 12 or 15 inches long from a tree, selecting a twig that has several leaves on it. Girdle it three or four inches from the base. Fill a narrow-mouthed bottle or flask half full of water. Put the twig in this bottle, holding it in place with absorbent cotton wedged into the neck of the bottle. Set it so the girdle is an inch above the surface of the water. Let this stand in a moderately warm place. When new roots appear upon it, do they grow above or below the girdle. What does this show?

What use does the Plant make of the food materials (sugar, starch, etc.) that it makes?

Demonstration XV. Put a layer of moist filter or blotting paper, crumpled in the hand, on the bottom of each of three quart fruit jars. Sprinkle on it, in each jar, a teaspoonful of radish seed or other quickly-germinating small seed. Add more paper and more seed, making three or four layers. Screw the cover on two of these jars. Cover the third with a thick cloth, tied on, and put through this cloth a small hole so a thermometer can be inserted, the bulb of which is pushed down into the layers of germinating seed. As the seeds germinate, compare the temperature inside the jar with that of the air outside. After the seeds have germinated in the other two jars, loosen the cap on one jar and slip it to one side so that a lighted splinter of wood can be inserted. What happens? Slip the cover of the other jar to one side so that 25 cc. of lime water can be poured in. Shake this around a bit and pour it out into a beaker. What does this show?

Have the students read several of the following (do not give out these readings until the experimental work has been

done, written up and discussed). They are merely aids in summarizing what the student has learned from the experiments.

Atwood, *Civic and Economic Biology,* pp. 91-96.
Coulter, *Elementary Studies in Botany,* Chapters 3 and 11.
Gager, *Fundamentals of Botany,* Chapter 8.
Gruenburg, *Biology and Human Life,* Chapter 10.
Hunter, *Essentials of Biology,* pp. 119-129.
Pool and Evans, *First Course in Botany,* pp. 62-77.
Transeau, *First Studies of Plant Life,* Part II.
Woodruff, *Foundations of Biology,* pp. 82-94.

If the principles of food manufacture and use in the plant have been reasonably well mastered, the students should be ready to solve problems like the following. A few of them may be discussed in class to begin with so the teacher may lead the pupils through the solutions, after which more of them should be thought through by the pupil without aid.

1. Why are trees and shrubs usually not transplanted in the summer time?
2. When transplanting tomato plants, why do you move a ball of earth along with the little plant?
3. Explain why root hairs are usually not present in water plants.
4. If a plant is dependent on the salts and nitrogenous materials in the soil, how can it get this in sufficient quantity after growing for some weeks in one spot?
5. Why does girdling a tree kill it?
6. A little salt added to the water in which cut flowers are kept standing often helps to keep them from wilting quickly. Why?
7. Which surface of a leaf is greener? Why?
8. The catch of fish is usually much greater in years that have a good many sunshiney days than in years when the weather has been quite cloudy. Why?
9. Plants generally grow faster at night than in the day time. Why?
10. Why do parsnips taste so much sweeter when dug in the spring than they do when dug in the fall?
11. Why does hay cut before its seeds are ripe have more food value than it does if cut after the ripening of the seeds?

D

An instructional unit under
The Health Ultimate Objective
Immediate Objective
A. Acquiring fruitful knowledge
3 a. Knowledge of definite means and ways through which one's physical efficiency and organic vigor may be developed to, and maintained upon, the highest level.

UNIT TITLE—WHY WE EAT SUNSHINE?

Preview

Teacher. John, when did you last eat sunshine?
Pupil. I do not think I ever did.
Teacher. What did you have for breakfast this morning?
Pupil. An orange, oatmeal and milk, and a poached egg on toast.
Teacher. A very good breakfast, John. But why did you eat it?
Pupil. Because I was hungry?
Teacher. But what made you hungry?
Pupil. I had not had anything to eat since last night at supper.
Teacher. Then food evidently satisfies our hunger. I wonder if we can think of any other reason for eating food? William, your father has an automobile. What does he feed the engine?
Pupil. I remember once when the engine stopped and Dad found the gasoline feed was choked. I suppose we might say we feed it gasoline. Is that what you mean?
Teacher. Yes, that's it. Now why do you feed it gasoline?
Pupil. Why, the engine will not go without gasoline.
Teacher. May, I remember you were sick last summer, so sick you could

eat very little for a couple of weeks. How did you feel when you tried to get up?

Pupil. I certainly had no go in me. I was so weak I could not stand up.

Teacher. George, can you tell us how the gasoline makes the engine go?

Pupil. The gas is mixed with air and set off by the spark in the cylinder and the mixture explodes and furnishes the power to drive the engine?

Teacher. I wonder if anything like that occurs in our bodies? James, do we need air?

Pupil. Yes, we must breathe it all the time.

Teacher. Where does it go in our bodies?

Pupil. Into our lungs.

Teacher. What happens to it then?

Pupil. I do not know.

Teacher. Does any one know?

Another pupil. It is taken into the blood.

Teacher. What does the blood do with it?

Pupil. The blood carries it to all parts of the body.

Teacher. What do the various parts of the body do with it?

Pupil. I do not know.

Teacher. Then there is one thing we must find out. What becomes of the food you eat, Alice?

Pupil. It goes down to the stomach.

Teacher. What happens to it there?

Pupil. It is digested.

Teacher. What does "digested" mean?

Pupil. I do not know.

Teacher. Then there is another thing we must find out. Phillip, will you please turn on the lights. Thank you, now will you tell me where the light comes from?

Pupil. The electricity makes it.

Teacher. Then electricity can change to light, can it?

Pupil. I think so.

Teacher. Where does the electricity come from?

Pupil. They make it at the power house.

Teacher. Do they really make it or do they change something else into electricity as you saw the electricity changed to light?

Pupil. All I know is that I have seen the dynamo and part of it whirls very rapidly and the electricity comes from the dynamo.

Teacher. Perhaps then that whirling motion, mechanical motion, is changed to electricity. That will do, Phillip. Ellen, what makes that dynamo go?

Pupil. A steam engine runs it.

Teacher. And what runs the steam engine?

Pupil. Steam.

Teacher. But what makes the steam?

Pupil. Coal is burned under the boilers and the heat boils the water and makes steam.

Teacher. So heat is changed to mechanical motion, and that to electricity and that to light. It is said that one can not create energy but that you can change it from one form to another. Is that so?

Pupil. I never heard that before, but it looks as if it might be true.

Teacher. Where does the coal come from and where does it get the energy to change to heat?

Pupil. The coal comes out of the ground, but I do not see where it gets the energy from.

Teacher. Can any one help us?

Another pupil. I have read that coal is just plants that lived a long time ago. They were buried under mud and sand and were so pressed together and the mud and sand made rock and the plants coal.

Teacher. If that is so possibly the coal has power because it was in the plants. Can we get power out of plants?

Pupil. We can burn wood to get heat and wood comes from plants.

Teacher. Where do plants get their power from? Mary, have you an idea?

Pupil. Plants have to have sunshine. Is that what you meant when you asked John when he last ate sunshine?

Teacher. Now you are getting on a warm trail. We have several things to find out now. Here is another one. Do plants store up energy they get from the sun and is it to get this

energy for ourselves we eat parts of plants?

Enough has been given of the class procedure to make apparent how the preview is conducted and what are its outcomes. The next step is the presentation. The outline which is the basis of the teachers talk and which in a less detailed form is given to the pupils as a basis for their study might be as follows:

Unit Topic, Why do we Eat Sunshine?

A. We have seen that one form of energy or power to do work can be changed into another. Heat is changed to mechanical energy by the steam engine. Mechanical motion is changed to electricity by the dynamo, electricity to light by the incandescent lamp. Name some device that changes electricity to mechanical motion? to heat? Can you think of an instance in which mechanical energy is changed to heat?

The law of the conservation of energy. Energy or power to do work may be changed from one sort to another but may not be created or destroyed. We will accept this law the truth of which is vouched for by all physicists (who is a physicist?), and only try to understand it now. The demonstration of it will come in physics. The first part of the law is probably clear. If energy can not be created or destroyed it is evident that a machine can do no more work than is put into it. The energy that appears in the form of electricity from the dynamo must be equal to that in the coal that is burned to run the engine which turned the dynamo less whatever was lost in friction, heat that escaped unused from the boilers or in other ways.

If a stone were hoisted by a steam engine to the fifth floor of a building under construction and then should slip and fall to the street it would strike with as much energy as was used in raising it. While it stands at the fifth floor level it holds the energy used to lift it up as energy of position, latent or *potential* energy. When it falls this latent energy becomes *kinetic* or active energy. Suppose the electric dynamo at the power house were run by a water wheel that is turned by water falling from the dam. The water above the dam has latent energy that becomes active as it falls. This water above the dam comes from up stream, from some tributary creek, from some spring along the creek, from the rain that keeps the spring flowing, from the clouds. But where does the water get its latent energy? How does it get up into the clouds. Read Barber's General Science pages 212-214 and 224-234. Might we call the electricity in this case transformed sunshine? Could the same name be used for the electricity developed by a dynamo that is run by steam power? See Caldwell and Eikenberry's, General Science pages 190-193.

B. It is evident that if we are going to compare two sorts of energy so as to be able to say we have as much of one as of the other, there must be units of measure for energy. For mechanical work the usual unit is the footpound or kilogram-meter. In what system of measures is the later unit used? If the stone in the above illustration weighs 200 lbs. and the fifth floor is fifty feet above the street level it would take 10,000 foot pounds of energy to raise it plus some to overcome friction. Another unit used for measuring mechanical energy is the horse-power. One horse-power equals how many foot pounds? In measuring heat the British Thermal Unit (B. t. u.) is commonly used. What is it and what is its equivalent in foot pounds? Another measure of heat energy is the gram calorie (cal) or the kilogram calorie (Cal). How will you define these units? Barber's General Science, pages 551-553.

C. Our bodies are machines. The energy that makes them go can not be created. We must obtain it in some potential form and release it in the body as kinetic energy.

(a) What becomes of the food taken into our bodies? Read Atwood Civic and Economic Biology, pages 108-114.

(b) What becomes of air taken into our lungs? Atwood's, Civic and Economic Biology, pages 114-122.

It is by the oxidation or burning of the substance of the body that the energy

is generated by which we move and perform our vital actions. We must burn up constantly to live. For some experiments to render clear the process of burning or oxidation, see Downing's Field and Laboratory Guide in Physical Nature Study, experiments 114-126 inclusive.

D. Foods are wisely selected then largely on the basis of their energy producing values. Read Thompson's Everyday Biology, pages 59-68, Gruenberg's Biology, Chapter XIX-XXIX, Trafton's Science of Home and Community, Chapter V.

E

An instructional unit—The Cell Theory

To precede the unit on Mendel's Laws. It is to be classified under the major objectives as is the latter, but will be devoted to

A. Acquiring fruitful knowledge
   1. Preparatory to acquiring other knowledge.

Sterilize a scalpel blade or knife blade holding it in a gas flame or the flame of an alcohol lamp for a few seconds. Turn down the lower lip and gently scrape the mucous membrane. Put the scrapings into a drop of water on a glass microscope slide. Add a tiny drop of acetic carmine. Cover with a cover glass. Absorb any excess of water with filter or blotting paper. Show to pupils this preparation under the demonstration microscope. Numerous cells will be seen stained with the carmine.

Mount stamen hairs of Tradescantia in a drop of water and show these under the demonstration microscope. Similarly show section of a leaf or plant stem and sections of animal tissue. The purpose of these demonstrations is to have pupils see cells and to realize that such cells constitute the living parts of animals and plants.

Show some unicellular animals and plants under the demonstration microscope and emphasize the completeness of their life processes. Show several kinds of cells, as, nerve cells, muscle cells, gland cells, or a variety of cells from plant tissues, in order to make clear the fact that different sorts of cells have a variety of forms and structures to suit them to their work.

Peabody & Hunt, Biology and Human Welfare, pp. 78-85.
Shull, Principles of Animal Biology, Chap. II.
Woodruff, Foundations of Biology, Chap. III or similar readings in other texts on biology.

Demonstrate various stages in cell division. Use sections of the growing root tip or teased preparations. Mount in water, stain with acetic carmine ready for examination under the demonstration microscope. Sections of the skin of a young tadpole also make good preparations. Make clear that cells originate by the division of previously existing cells. Call attention to the various parts of the cell and to the careful splitting of the chromosones in the equation division. What is reduction division and when does it occur?

Atwood, Civic and Economic Biology, pp. 214-220
Shull, Principles of Animal Biology, Chap. IV and pp. 207-213.
Woodruff, Foundations of Biology, pp. 234-271. or similar readings.

F

An instructional unit which for some will come under

The Vocational Ultimate Objective

Immediate Objective

A. Acquiring fruitful knowledge
   1. (a) Necessary to undertake advanced technical or professional study (in animal or plant breeding);

For others it will come under

The Leisure Time Objective

A. Acquiring fruitful knowledge
3—1—2. Responsibility to the home;

For most under

The Social Ultimate Objective

A. Acquiring fruitful knowledge
   3. a. The operation of the principle of cause and effect in social phenomena.

MENDEL'S LAWS

Study of the flower and its parts. The nature of fertilization. Give pupils experience in cross-pollinating such plants as garden peas, nasturtiums. Observations on developing eggs. Watch tadpoles grow from frog eggs, silk worms, or other insects, from their eggs.

Atwood, Civic Biology, p. 200-205 and p. 220-225.

Peabody & Hunt, Biology and Human Welfare, pp. 246-263, 227-233.

Shull, Principles of Animal Biology, pp. 174-180.

Downing, The Third and Fourth Generation. Chaps. IV-VI.

Make clear what happens in the F_1 and F_2 generations, when there are crossed two individual animals or plants that differ in a single character like black and white guinea pigs or tall and short pea plants. Similarly state the facts in regard to the crossing of two individuals differing in two characters.

What is meant by partial dominance as found in black "blue" and white andulasian fouls, red, pink and white four-o'clocks, red, roan and white cattle?

Atwood, Civic and Economic Biology, pp. 309-340.

Shull, Principles of Animal Biology, Chap. XI.

Woodruff, Foundations of Biology, pp. 272-305.

Experiments with or demonstrations of the breeding of fruitflies, garden peas, corn, or similar materials so that pupils will understand thoroughly Mendel's Laws. Through appropriate readings, learn how this knowledge has been useful to man, (1) in the production of strains of wheat that will mature early to avoid frosts, that will stand against high winds, and will mill satisfactorily; in the production of beets with high sugar content; of hogs that produce large yields of lard, of chickens that lay two hundred eggs or more a year. (2) Ways in which these laws have been useful to man in understanding human inheritance.

Downing, Third and Fourth Generation.

Guyer, Being Well Born.

The potency of heredity in human life. Francis Galton's studies of identical twins. E. L. Thorndike's mental tests of brothers and sisters.

A. The inheritance of ***physical*** characters in man. (a) Simple dominants. Brachydactyly, (thumbfingeredness), hexadactyly (six fingers and toes), symphalangy, lobster claw, white forelock, eye color (confused by some sex-linkage). (b) Recessives. Albinism, sensitive asthma, deaf mutism. (c) Sex-linked. Colorblindness (red-green) hemophila (bleeders) eye-color (partial). Inheritance of immunity to disease.

B. The inheritance of ***mental*** characters in man: (a) The probability as great as for physical characters. Pearson's measurements and correlation coefficient. (b) Inheritance of *ability.* Galton's studies of the families of great English judges. Galton and Schuster's Noteworthy Families. Eminent persons in American Dictionaries of Biography are related in the ratio of 1:5; average men related to them in probable ratio of 1:1000. Family of Charles Darwin. Inter-marriage of cousins. (c) Inheritance of *dysgenic characters.* Max-Jukes. Feeble-mindedness, Martin Kallikak. Inheritance of insanity, epilepsy. Burden of these classes. 500,000 feeble-minded in U. S. 10% in institutions. 200,000 insane in institutions. 150,000 epileptic. 165,000 criminals in prisons; 30-80% feeble-minded. 80,000 paupers in almshouses. These would be largely eliminated in the struggle for existence in primitive races.

See books already cited and

Simott and Dunn, Principles of Genetics.

East, Heredity and Human Affairs.

The readings in connection with the above will necessarily develop appreciation of the work of Scientists, of the scientific method of attack on problems and will tend to broaden interests and establish ideals.

Test the understanding of these principles by working these problems:

A brown-eyed man and a blue-eyed woman have six children, three blue-

eyed and three brown-eyed. What are the genotypes of the parents?

Two brown-eyed parents have a blue-eyed son. This son marries a brown-eyed woman, one of whose parents was brown-eyed, one blue-eyed. The first child in the son's family is blue-eyed. What were the genotypes of its grandparents?

A left-handed, brown-eyed man marries a blue-eyed, right-handed woman. One child is brown-eyed and right-handed, one brown-eyed and left-handed, one blue-eyed, right-handed, and one blue-eyed, left-handed. What were the genotypes of their parents?

A brown-eyed left handed man with two brothers who are blue-eyed and right-handed marries a blue-eyed right-handed woman whose mother and sister are brown-eyed but left-handed. What will you expect the children of these parents to be with reference to these characters and what were the probable genotypes of their grandparents?

A six-fingered albino marries a normal-appearing individual. Half the children are albinos, half six-fingered. What were the genotypes of the parents?

A color-blind man marries a woman with normal vision whose father and grandfather were color-blind. Would any of their children be color-blind? If so, which ones?

A heterozygous, brown-eyed, color-blind man marries a blue-eyed, color-blind woman. What will their children be as far as this character is concerned? The man's father was not color-blind nor his brother. Was his mother color-blind?

In a certain family of children half of the sons, but none of the daughters, are color-blind. Half of these children are brown-eyed and half blue-eyed. What are the genotypes of the parents?

G

There are enclosed herewith the test questions on the unit checked below:

Unit I Photosynthesis
Unit II Why We Eat Sunshine
Unit III The Cell Theory
Unit IV Mendel's Laws

A teacher might, on receipt of these questions, continue instruction on the unit in order to prepare the pupils specifically for answering them. That would of course defeat the purpose of this investigation. The test is to be given when the class has, in your judgment, thoroughly done the work outlined in the mimeographed sheets sent you for this unit.

Please send the test papers of all pupils to me for scoring as soon as you can. The average grade made by the class and the range will be reported to you only. In my report of this study schools will be designated by number and not by name. The examinations are not competitive. It is merely desired to find out how long it takes to teach such units well.

Please report to me how long the class spent on the unit, thus, 7 class periods of 45 minutes each and 2 laboratory periods of 90 minutes each or just give the total, 495 minutes.

Send the test papers either by mail or by express. If by express, send collect. Postage will be returned to you promptly.

Thank you for your continued co-operation.

Yours truly,
Elliot R. Downing.

H

I

Please write with pencil as ink blots this paper. Date.....
Name..... City..... State.....
Fill in each blank space. Thus the first one is filled with "green."

1. The ..... leaf manufactures food materials. It takes in ..... from the air, water absorbed by the ..... and other materials dissolved in the water and combines them to form such foods as ..... These food materials are used by the plant for growth and to furnish the energy needed in its activity. This energy is set free in the plant by the process of ..... Food manufacture can go on only when the plant is in the ..... It is made possible by the green coloring material or ..... which absorbs the energy of the .....
2. What does a plant do in breathing and which experiment showed this? (Answer on the back of the sheet).
3. If a potted green plant were put into a large air tight jar, from the air in which the oxygen had been removed, would it live longer in the dark or in the light? Why? Mark with a cross (X) the best answer and below the best reason.

   In the light. In the dark. It would make no difference.

   Best reason. A plant does not need oxygen in the dark.
   Nothing can live without oxygen.
   In photosynthesis a plant gives off oxygen.
   A plant in the light must have oxygen with which to make food.
4. Fungi like toadstools or mushrooms, yeast, and some colorless higher plants like Indian pipe contain no chlorophyll. How do they get their food? Mark (X) best answer.
   They do not need any—only green plants need food.
   They get it already made by other plants, often as decaying organic matter.
   They have other coloring matter that serves in place of chlorophyll.
   They live on the dirt, the mineral matters.
5. In an aquarium containing only fish, snails, or other water animals, the water must be changed often. But if water plants are present it need not be changed. Why? Mark (X) the best answer.
   Because the plants keep the water clean.
   Because the plants serve as food for the animals.
   Because the animals breathe off carbon dioxide which the plants use when they breathe.
   Because plants in the light give off oxygen which the animals need for breathing.

I

II

Please write with pencil as ink blots this paper. Date.....
Name..... City..... State.....

1. Check the statement which *best* completes the sentence below.
   Sugar is used in our bodies after we eat it
   a. to make richer blood
   b. to supply energy
   c. to make us grow
   d. to produce heat by its oxidation
2. Fill in the blank spaces with words that best complete the meaning in the following.
   If you start to run rapidly your heart beats faster, you breathe more deeply because the ..... must be carried from the lungs to the ..... because they need more .....

3. Lamb chops yield 1600 calories per pound and a pound costs 35 cents. Bacon yields 3000 calories per pound and costs 50 cents a pound.
   Which is the cheaper food? .....
   Why? .....
4. Fill in the blank spaces.
   When one is chilled he often shivers as muscles begin to contract irregularly. This muscular action requires ..... which is generated by ..... of ..... Some of the ..... is also set free as ..... and so serves to make us warm.
5. Check the statement which best completes the sentence.
   When we breathe the oxygen of the air
   a. unites with the blood in the lungs and there produces energy
   b. is changed to carbon dioxide which we give off from the lungs
   c. is carried by the blood all over the body to the working cells where oxidation occurs to liberate energy.
   d. is carried in the blood to the stomach where the food is burned to produce energy that we need to move and live.

J

III

Please write with pencil as ink blots this paper. Date.....
Name..... City..... State.....

1. Put a T in front of each one of the following statements if it is true.
   a. The body of the cell is made of protoplasm.
   b. No single cell can perform all the activities of a living being.
   c. The cell nucleus stains deeply because it contains so much chromatin.
   d. The living cell must have oxygen and food and must get rid of the wastes produced by oxidation.
   e. Animals and plants are made of nothing but cells.
   f. When a cell divides each chromosome *always* splits lengthwise so one daughter cell has chromosomes that are just like the other one.
   g. An organ like the stomach is made up of tissues like muscle tissue, gland tissue and each tissue is made of similar cells.
2. In the following outline sketches draw in the chromosomes and other cell parts to show what happens to them in successive stages of division.

K

IV

Please write with pencil as ink blots this paper. Date.....
Name..... City..... State.....

1. Fill in the blank spaces in the following:
   Characters are usually ..... as such, though in some cases two or more ..... interact to produce the character as in the case in .....
   Characters that are united in a parent usually ..... in the grandchildren. That is, if tall pea plants with green seeds are crossed with short plants bearing yellow seeds, their grandchildren will also include ..... plants with ..... seeds and ..... plants with ..... seeds.
   Corresponding maternal and paternal chromosomes, that is those that determine characters like tall and short, always go to ..... cells in the ..... division.
2. When red and white four o'clocks are crossed, the plants produced bear pink flowers. If these plants are interbred, what will be the result.

3. When a tall pea plant bearing yellow seeds is crossed with a short plant with yellow seeds (tall and yellow are dominant) the offspring are in proportion of three tall plants with yellow seeds, three short plants with yellow seeds, one tall with green seeds, one short with green seeds. What are the genotypes of the parents?

   A blue-eyed, six-fingered man, one of whose parents was six-fingered, the other normal, marries a brown-eyed, five-fingered woman whose mother was brown-eyed and father blue eyed. If they had eight children what would you expect their characteristics would be as far as these characters are concerned?

   (Brown eyes and six fingers are dominant.)

Please leave work on the problems on the back of this sheet.

Additional Studies Relating to Physics[1]

(A Committee Report)

By A. W. HURD, Chairman
Institute of School Experimentation
Teachers College, Columbia University

PART I. THE EXPERIMENTAL USE OF TEACHING UNITS IN PHYSICAL SCIENCE

In the fall of 1929, plans were made for the experimental use of teaching units in physical science. One hundred seven classes of more than twenty-five hundred pupils taught by thirty-six teachers in thirty schools, received unit outlines and tests. Twenty-five schools in twenty-three cities in fourteen different states finally furnished test data for one or more units. A summary of these data is given in the accompanying table. Where it has been possible, data for individual classes have been kept separate so that instructors may compare achievement records of their several classes. Altogether *sixty-four* pupil groups are represented in the data varying from four to eighty-six in the number of pupils per group.

An example may serve as an aid in interpreting the table. On Unit II (see first section of table), School I enrolled 80 pupils, practically all of them in the eleventh grade. The amount of class time given to the unit was that specified, viz. 600 minutes. The mean score in the preliminary test was 16.70 score points of a possible score of 59, making a percent score of 28. 3. The standard deviation (a measure of variability) was 7.44. The mean score on the final test was 29.50 score points or 50.0 percent. The standard deviation for the final test was 9.20. The mean gain in score points (final minus preliminary) was 12.80 or 21.7 percent with a standard deviation of 5.88. The table gives similar data for all the units from which tests were received. Where data are missing in the table the school failed to give the missing information.

[1]The present article is in three separate parts. These taken together constitute another one of the sets of studies and reports made under the direction of the Committee on Standards for Use in the Reorganization of Secondary School Curricula. This Committee is sponsored by the Commission on Unit Courses and Curricula. Since it began publishing its studies in the Quarterly in 1926, this Committee has prepared 30 separate and distinct pieces of work. These will be found listed in the News Notes of this issue. See page 442 for price of reprints of this article.—The Editor.

Achievement Records on Preliminary and Final Tests for Units in High School Physics, 1929-1930

UNIT II—Possible Score: 59

School	Grade	Pupils	Teaching Time	Pre-Test Raw Score	Pre-Test Mean Per Cent	Pre-Test S. D. Per Cent	Final Test Raw Score	Final Test Mean Per Cent	Final Test S. D. Per Cent	Gain Raw Score	Gain Mean Per Cent	Gain S. D. Per Cent
A	11	86	650	.....	.....	.....	23.86	40.4	9.55	.....	.....	.....
D	11 & 12	14	650	6.53	11.1	5.80	24.00	40.7	9.16	17.47	29.6	9.76
I	11	80	600	16.70	28.3	7.44	29.50	50.0	9.20	12.80	21.7	5.88
T	12	5	750	22.80	38.6	11.12	30.80	52.2	4.40	8.00	13.5	6.18
Y	11	24	.....	9.79	16.6	6.23	23.38	39.6	5.70	13.59	23.0	6.08
Y	11	21	.....	13.29	22.5	6.96	24.95	42.3	6.83	11.67	19.8	5.77
Y	11	20	.....	11.30	19.1	6.43	20.65	35.0	4.27	9.35	15.8	8.66
H	10 & 12	19	.....	6.05	10.2	5.42	18.11	30.7	6.09	12.06	20.5	5.40
H	10 & 12	9	.....	4.11	7.0	1.45	16.67	28.2	4.11	12.56	21.3	3.06

School	Grade	Pupils	Teaching Time	Pre-Test Raw Score	Pre-Test Mean Per Cent	Pre-Test S. D. Per Cent	Final Test Raw Score	Final Test Mean Per Cent	Final Test S. D. Per Cent	Gain Raw Score	Gain Mean Per Cent	Gain S. D. Per Cent
UNIT III—Possible Score: 101												
A	11	82	.....	.....	.....	.....	38.54	37.4	9.92	.....	.....	.....
B	11	30	730	10.93	10.8	6.68	41.90	41.5	10.90	30.97	30.7	9.30
B	11	29	730	13.82	13.7	10.41	43.79	43.4	13.66	29.97	29.7	9.60
B	11	30	730	9.20	9.1	5.92	36.53	36.2	7.29	27.33	27.1	6.29
B	11	28	730	12.41	12.3	7.24	41.10	40.7	11.30	28.69	28.4	6.82
U	12	34	.....	10.74	10.6	7.33	18.41	18.2	7.12	7.67	7.6	6.20
L	11	23	750	7.00	6.9	5.04	14.09	13.9	9.00	7.09	7.0	8.67
UNIT IV—Possible Score: 66												
A	11	82	500	15.85	24.0	7.20	33.09	50.1	7.85	17.24	26.1	4.90
UNIT V—Possible Score: 78												
Q	12	6	680	18.68	23.9	2.72	39.32	50.4	9.92	20.64	26.5	7.28
R	11	26	750	22.00	28.2	6.84	41.38	53.0	7.42	19.38	24.8	7.37
L	12	54	.....	.....	.....	.....	44.13	56.6	10.04	.....	.....	.....
G	12	20	.....	25.30	32.4	7.68	46.40	59.5	12.76	21.10	27.0	8.67
UNIT VII—Possible Score: 70												
C	10 & 12	20	500	5.40	7.7	3.76	22.70	32.4	5.39	17.30	24.7	5.64
C	10 & 12	27	500	6.67	9.5	4.51	27.55	39.3	7.55	20.88	29.8	5.19
UNIT VIII—Possible Score: 121												
P	12	20	750	19.14	15.8	9.25	55.81	46.1	17.46	36.67	30.3	13.26
UNIT IX—Possible Score: 131												
A	11	28	2205	.....	.....	.....	94.78	72.3	10.24	.....	.....	.....
A	11	43	2205	.....	.....	.....	81.19	62.0	20.54	.....	.....	.....
F	12	28	.....	44.59	34.0	16.91	94.00	71.7	15.20	44.91	37.7	14.60
F	12	37	.....	47.59	36.3	16.46	92.84	70.9	15.52	45.25	34.6	12.57
F	12	39	.....	38.05	29.0	13.71	86.08	65.7	17.78	48.03	36.7	14.90
G	12	40	960	38.65	29.5	20.83	73.70	56.3	21.41	35.05	26.8	12.85
S	11 & 12	5	750	20.00	15.3	4.76	84.00	64.1	20.79	64.00	48.8	17.41
U	11	55	.....	21.55	16.4	9.50	38.09	29.1	14.05	16.54	12.6	8.70
W	11 & 12	24	750	20.88	15.9	16.42	51.65	39.4	19.59	30.77	23.5	12.37
W	11 & 12	24	750	31.96	24.4	19.52	75.87	57.9	19.05	43.91	33.5	10.74
UNIT XI—Possible Score: 84												
H	11 & 12	17	360	21.65	25.8	8.56	58.53	69.7	15.95	36.88	43.9	12.96
H	10 - 12	28	360	15.57	18.5	10.52	51.60	61.4	14.24	36.03	42.9	12.51
UNIT XII—Possible Score: 94												
J	11 & 12	14	400	12.07	12.8	7.61	37.07	39.4	12.02	25.00	26.6	10.06
UNIT XIII—Possible Score: 40												
Z	12	18	500	.....	.....	.....	28.11	70.3	4.74	.....	.....	.....
UNIT XV—Possible Score: 79												
D	12	22	400	11.18	14.1	6.28	60.67	76.3	6.16	49.09	62.2	6.88
D	11 & 12	19	400	5.58	7.1	2.72	52.47	66.4	3.76	46.89	59.3	6.12
E	11	24	400	14.54	18.4	10.39	50.33	64.5	10.45	35.79	46.1	9.53
E	11	27	400	13.07	16.5	5.60	51.37	65.0	9.29	38.30	48.5	8.94
E	11	29	400	15.93	20.2	9.13	54.46	68.9	10.02	38.54	48.7	7.75
F	12	30	.....	12.57	15.9	9.12	56.70	71.8	11.09	44.13	55.9	13.47
F	12	36	.....	12.42	15.7	7.49	59.45	75.2	7.25	47.03	59.5	7.62
F	12	37	.....	11.00	13.9	6.70	61.84	78.3	8.27	50.84	64.4	10.82
UNIT XVI—Possible Score: 75												
F	12	28	.....	13.37	17.8	4.55	47.80	63.7	8.29	34.43	45.9	7.90
F	12	37	.....	13.00	17.3	5.56	51.54	68.7	6.91	38.54	51.4	8.59

School	Grade	Pupils	Teaching Time	Pre-Test Raw Score	Pre-Test Mean Per Cent	Pre-Test S. D. Per Cent	Final Test Raw Score	Final Test Mean Per Cent	Final Test S. D. Per Cent	Gain Raw Score	Gain Mean Per Cent	Gain S. D. Per Cent
F	12	39	.....	10.64	14.2	4.43	48.87	65.2	9.63	38.23	51.0	10.54
M	10 & 12	19	300	14.36	19.1	5.60	29.16	38.9	6.32	14.80	19.7	4.72
N	12	14	500	11.72	15.6	4.44	28.85	38.5	11.96	13.14	17.5	9.48
O	11	39	.....	.....	.....	.....	49.50	66.0	9.16	.....	.....	.....
S	11 & 12	4	500	15.00	20.0	3.31	60.25	80.3	7.36	45.25	60.3	5.17
G	12	19	.....	15.47	20.6	5.62	36.63	48.8	9.77	21.16	28.2	6.70
G	12	19	.....	16.63	22.2	7.60	40.95	54.6	9.32	24.32	32.4	6.53
X	11	24	.....	13.92	18.6	4.29	35.67	47.6	8.99	21.75	29.0	9.15
X	11	27	.....	11.19	14.9	4.49	35.89	47.8	9.41	24.70	32.9	8.55
				UNIT XVII—Possible Score: 33								
I	11	29	180	5.55	16.8	3.96	16.69	50.6	3.23	11.14	33.8	3.05
I	11	31	180	4.77	14.4	3.24	19.00	57.6	4.06	14.23	43.2	3.85
I	11	16	180	3.88	11.7	2.60	19.69	59.7	3.31	15.81	48.0	3.96
F	12	26	.....	6.46	19.6	3.98	23.65	71.7	3.37	17.19	52.1	5.36
F	12	32	.....	4.91	14.9	2.41	26.09	79.1	2.37	21.18	64.2	3.23
F	12	32	.....	4.22	12.8	2.16	24.94	75.6	3.71	20.72	62.8	4.27
				UNIT XIX—Possible Score: 126								
K	....	10	750	66.80	53.0	16.55	90.00	71.4	7.59	23.20	18.4	12.78

In the task of instruction, data of this kind should be worth while for purposes of comparison, and efforts should follow to improve records of achievement. After all, high achievement records are what we are striving for in our schools. To be sure, we should not fail to realize that our present achievement records do not include some possible phases of achievement which we may be neglecting to recognize, but achievement records may be expected to become more complete as a result of the study of our present records.

A study of the records of the several classes in a given school is an interesting and profitable undertaking in order to discover the reasons for different achievement scores in different classes or for similar scores in different classes. For example, why do the four classes in School B on Unit III show variations in achievement? Possible explanations reside in differences in the *pupils enrolled* in the several classes or differences in the *means, methods or materials of instruction.* Each situation presents problems of its own.

One is likely to be impressed by the rather low ratings if he has been used to thinking in terms of a passing grade of 70 percent, for example. On these tests the average final score in percent per group is but 54.1. "Why so low?" is a question for which an answer is desirable. The highest mean percentage score for any group in a final test is 80.3 made by School S on Unit XVI. The highest mean gain from preliminary test to final test is 64.4 percent made by one class in School F. Should tests not show very high final ratings and very great gains made due to instruction approaching 100 percent? Are our tests too difficult or the instruction too inadequate? Or, on the other hand, are our goals too vague, indefinite or poorly defined; or the tests not well designed for measuring all phases of achievement?

While answers to these questions are not available, the experiments were planned for the purpose of stimulating search for such answers, and especially to increase achievement ratings on certain elements of instruction in physical science considered important to an understanding of our common environment.

According to the stipulated rules for the experiments, special recognition was to be given to the school making the best record of achievement in any unit of instruction. There are undoubtedly many factors which might be considered in deciding which school should receive

the recognition. It has been decided that for this series of unit trials, the mean gain in percent for the unit should constitute the basis of judgment. On this basis School F is the winning school.[2] The record was made on Unit XV with the class of 37 pupils. While the time given for the unit was not stated by the instructor, it was less than that originally specified for the unit.

School S on Unit XVI deserves special mention as the final mean score in percent was the highest made, and the mean gain was 60.3 percent.

It is clear that there might have been other bases of decision used in giving recognition, so that many other classes undoubtedly deserve much credit for the good work done. Certainly all instructors entering such a contest show a commendable experimental spirit which should eventually bear fruit in increased efficiency of instruction.

[2]School F has been awarded a choice of the following recognitions:

1. Selected reference books for the library not to exceed $25 in cost, to be suitably inscribed.

2. A framed certificate giving proper acknowledgment of the success of the class.

3. Twenty-five dollars in cash to be used for a specified worthy purpose.

The records given in the table supplement records published in a former article[3] and cover the same units. The latter data were collected during the school year of 1928-29. While the average gain in percent during 1929-30 is not much greater, there are a greater number of classes reaching higher levels of accomplishment. There seems no valid reason why higher levels should not be attained by all, as the tests were designed to measure what might be called minimum essentials. Individual differences were provided for by suggested projects for the more capable pupils. It seems wise to set some minimum standards of attainment and we can feel justified in requiring a higher degree of accomplishment.

During the current year (1930-31) another set of experiments will be conducted. These will cover certain units of instruction on essentials of electricity and sound. If you have suggestions send them in. For further information address the Institute of School Experimentation, Teachers College, Columbia University, 433 West 123rd Street, New York City.

[3]A. W. Hurd, Progress Report on the Development of Teaching Units in High School Physics. *North Central Association Quarterly*, September, 1930.

PART II. CURRICULUM DEVELOPMENT BASED ON UNIT EXPERIMENTATION IN PHYSICS

To be of permanent value, experimentation must be based on a sound philosophy. Undoubtedly, every educational experiment has either an expressed or implied philosophy. For example, when one makes a canvas of the mathematics needed in high school physics, he implies acceptance of the course now taught with further inference that this course is more or less common to many schools. On the other hand there are researches which assume that our present representative courses in physics need revision and reorganization—possibly necessitating *more*, or *less* mathematics. Without discussing this matter here, it may be stated that the value of any research is very much dependent upon its expressed or implied philosophy. Intelligent evaluation of a research should attempt to discover clearly its underlying philosophy, and intelligent research should clearly recognize its basic assumptions.

Curriculum development may be accomplished by the experimental use of teaching units. Actually, curriculum development up to the present has been accomplished through the use of curriculum materials in teaching situations. There seems opportunity, however, to make development more rapid and efficient by the use of more carefully thought out techniques. The present account is part of an attempt to find improved techniques.

Some basic *assumptions* which must be kept in mind are as follows:

1. The school is a social institution

for the welfare of society through individuals. The ultimate aims should be those that promote *health, vocational* satisfaction, *avocational* satisfaction, and the continuous improvement of *society* as a whole. The energies of all courses in the curriculum, whether in language, history, mathematics, art, or science, should be directed toward the accomplishment of these ultimates.

2. A reorganization of our present courses is feasible and desirable to better accomplish the stated ultimates.

3. For efficient instruction the work of a course may well be organized into teaching units.

4. Each teaching unit in physics may well be organized about concrete things in the environment about which the pupil should know more.

5. Each teaching unit should contain a list of common activities for all pupils, essential to an understanding of the unit.

6. Each teaching unit should have attention directed to specific items of (a) knowledge or information, (b) techniques, (c) attitudes or appreciations, (d) habits or skills.

7. Provisions should be made for individual differences including projects and supplementary reading.

8. The various phases of achievement should be evaluated by tests prepared for that purpose.

9. Teaching units should be modified in the light of concrete data of achievement.

In keeping with these assumptions, a plan has been formulated and experimental teaching units in physics have been used in accordance with this plan for two school years. Reports of progress have been published[1,2] and considerable data given. Nineteen teaching units have been outlined and seventeen used experimentally.

Table I. Schools Classes and Pupils Involved in the Teaching Experiments

Unit	Number of Schools		Number of Classes		Number of Pupils	
	Pre-Test	Final Test	Pre-Test	Final Test	Pre-Test	Final Test
I	5	5	11	11	300	309
II	3	5	5	12	212	296
III	4	4	12	8	396	375
IV	2	2	5	5	114	123
V	6	7	9	11	185	226
VI	1	1	2	2	36	34
VII	2	3	4	6	84	124
VIII	3	4	5	7	105	143
IX	5	6	9	12	249	337
X	2	2	4	4	80	81
XI	1	1	2	2	51	54
XII	1	1	1	1	15	14
XIII	—	1	—	1	—	18
XV	3	3	8	8	229	223
XVI	8	8	13	15	332	370
XVII	2	2	6	6	180	186
XIX	1	1	1	1	10	10

Table I shows the extent of the experimental trials from which preliminary and final test data have been secured.

From these tests, tally sheets have been made, showing the number and percent of correct responses made to each preliminary and final test item. In this

[1]A. W. Hurd, Reorganization in Physics. North Central Association Quarterly, September, 1929.

[2]A. W. Hurd, Progress Report on the Development of Teaching Units in High School Physics. North Central Association Quarterly, September, 1930.

article, only Unit VIII will receive consideration.

Unit VIII concerns "Electric Lighting Systems." This unit is selected because of its universal importance. There will probably be no objection to the statement that this subject should receive attention somewhere in the school curriculum. It is now treated incidentally under current electricity in physics. It is believed that its inclusion as a specific unit of instruction will make more feasible its treatment in the furtherance of the ultimate objectives given above, and will direct attention to the more functional aspects needing emphasis. This attitude is made clearer by a quotation from the introduction to the unit:

"Electric lighting systems are a development of civilization and community life. They are, therefore, social institutions, and yet they are dependent upon scientific discovery and invention. The rapid increase in the knowledge of electricity, the production and control of electric currents, and the invention and constant improvement of incandescent and arc lamps, have been nothing short of remarkable, occurring as they have, in such a relatively short period. Our present electric lighting systems are products of the last fifty-year period, though the foundations were laid somewhat more than a century and a quarter ago.

"Everyone should know some of the simple principles of electric lighting, so that he may more intelligently use them. Ignorance of even the simpler concepts is outstanding. This unit has as its purpose an explanation of the more elementary conceptions and principles. Attention is directed to the opportunities offered in vocations and avocations in this field. Better sanitary and health conditions have come through the use of electric lights. This should be appreciated. Particularly it should be seen that through such social developments as electric lighting systems we are dependent upon our social organizations and consequently we have responsibilities in helping to maintain and properly support them."

Whether or not such a teaching unit is properly placed in a course in physics, or in a course in junior high school or elementary school science may be open to dispute. The feasibility of various grade placements may be determined by further experimentation, which, by the way, may properly be an outgrowth of the experimental work already carried on with this unit.

From the test data available, a tabulation and analysis of responses to test items in the *preliminary* and *final* tests would seem worthwhile. This project would attempt to answer the question, "What informations, appreciations, and techniques do eleventh and twelfth grade pupils have, before and after instruction in a unit on electric lighting systems?" The test items used are key words in uncompleted sentences. It is not always possible to tell with certainty, why a pupil could not fill in a blank correctly. Whether the specific difficulty is one of a lack of information, an inability to think of the exact word, or an inability to follow the particular thoughts of the one devising the test, is sometimes in doubt. Interpretations of the responses in the following paragraphs attempt to keep these difficulties in mind. The uncompleted statements were framed to avoid the irrelevant difficulties as well as they could be judged. For example, enough of the sentence was given so that the general drift of the thought could be determined. The attempt was made to omit only a key word which the pupil would get from proper instruction. Critical concepts were selected as omissions —not ones immaterial to the specific thought in mind. These will be noticeable in the succeeding lists. One method of validating these may be the recasting of the items in different forms and correlating the scores received on the different forms. Such a procedure is in contemplation for further experimentation. *This project should, of itself, make the concepts stand out in the tester's mind, and may well be considered an integral step in curricular development.* It is reasonable to teach concepts the acquisition of which is judged from testing programs. Therefore the more

clearly they may be expressed in tests, the more unmistakable they become for objectives of instruction.

Table II gives data to show the relative correctness of response to items in the preliminary and final tests. These were identical tests, but care was taken to keep this fact from students and teachers using the unit. The table should be interpreted as follows: The first entry shows that there were 59 items of a total of 121 which received correct responses by less than 10% (0-9) of the pupils taking the test; and but 9 such items in the final test.

It is clear that after instruction, there were much greater percentages of correct response than before instruction. *This is evidence of the fact that instruction was directed toward the understanding of the concepts given in the test. In other words, this is evidence of validity of the test items as stated.* Before instruction no item received over 70% of correct response; after instruction 32 items received over 70% of correct response, 13 receiving over 80%, and 6 over 90%. Before instruction 94 items received less than 30% of correct response; after instruction 34 items received less than 30%.

It is apropos to study the specific items to determine *what items* received small or large percentages of correct response. It will then be in order to try to find answers to the questions:

1. Why were there so few or so many correct responses to these items?
2. Is it important that there be large percentages of correct response to every item? In other words, are all of these items important?

Table II. Number of Test Items in Test VIII Receiving Various Percentages of Correct Response

Percentages of Correct Response	Preliminary Test	Final Test
0- 9	59	9
10- 19	18	10
20- 29	17	15
30- 39	11	10
40- 49	11	9
50- 59	4	15
60- 69	1	21
70- 79	0	13
80- 89	0	13
90-100	0	6
Total Number	121	121

The second question may help to answer the first.

In the list given in Table III, some judgment is used in interpreting what the specific items involved primarily. The test has been revised and the exact original statements of the items retained may be examined if the reader wishes.[3] The items may be identified in the list below by the number in parentheses immediately after the list number. That is, the number in parentheses is the same as the number given in Test VIII in the Work-Test Book. The items which were eliminated will be given later in this article.

[3] A. W. Hurd, Work-Test Book in Physics. The Macmillan Company, 1930.

Table III. Interpreted Items with the Percentage of Correct Response in the Preliminary and Final Tests

Item		Percentages Pre-Test	Final Test
1-1 (1-1)	Whether *A. C.* or D. C. is used in this country generally for electric lighting	47	55
1-2 (1-2)	What voltage is most common for electric lighting?	67	92
2-1 (2-1)	The *generator* as the common current source	1	2
2-2 (2-2)	*High* voltage transmission	38	68
2-3 (2-3)	Transformers as voltage increasers	21	65
2-4 (2-4)	*Three wire* transmission system	3	5
2-5 (2-5)	Voltage *decrease* before entering city	10	29
2-6 (2-6)	About *2200 volts* for city transmission	4	10
2-7 (2-7)	*Transformers* as voltage decreasers	26	63
2-8 (2-8)	About *110 volts* for residence use	28	67
2-9 (2-9)	About *110 volts* for incandescent lights	27	70
2-10 (2-10)	Lights rated in *watts*	39	78
2-11 to 2-14	(2-11) to (2-14) Common sizes of lamps in watts	39	73
	(These items indicate ability to give one, two, three, or four common sizes.)	40	68
		29	68
		32	70
2-15 (2-15)	Lights commonly in *parallel*	20	82
2-16 (2-16)	More lights on, less resistance	12	56
2-17 (2-17)	More lights on, more current	12	46
2-18 (2-18)	16 and 17 in accordance with Ohm's law	11	88
3-1 (3-1)	Light bills on the basis of *watt-hours*	43	63
3-2 (3-2)	Meters are *watt-hour* meters	8	18
4-1,2 (4-1,2)	Metals used in a simple voltaic cell	45	82
		40	85
4-3 (4-3)	Solution used in a simple voltaic cell	36	78
5-1,2	Cells generally connected in *series* or *parallel*	56	99
		48	99
6-1,2	Principle of a generator *rotation* of the armature in a *magnetic* field	32	50
		48	85
7-1	A primary cell gives a *current* when made	34	66
7-2	A secondary cell must be *charged*	35	65
7-3	Lead cell the most commonly secondary cell	5	23
7-4	Voltage of lead secondary cell	9	34
7-5	Internal resistance of lead cell low	6	36
7-6	Current from lead cell may be very *high*	11	25
8-1 to 4	Four types of primary cells	26	49
	(These items indicate ability to name one, two, three, or four primary cells)	9	44
		1	37
		0	24
9-1	The *dry-cell* the most common	47	73
9-2	Voltage of the dry cell	21	53
	Internal resistance of the dry cell relatively high	16	21
10-1	The thermo-couple as a generator by heat energy	0	28
11-1	The *ampere* as the unit of current	16	84
11-2	The *volt* as the unit of E. M. F.	14	82
11-3	The *ohm* as the unit of resistance	19	87
12-1 to 4 (5-1 to 4)	Four factors determining resistances of wires	26	83
	(These items indicate ability to name one, two, three, or four	23	82

Item		Percentages Pre-Test	Final Test
	factors of resistance.)	20	71
		10	61
13-1 (6-1)	Current directly as E. M. F.	6	52
13-2 (6-2)	Current inversely as *resistance*	8	54
14-1	Current from a battery dependent upon E. M. F. of each cell	28	50
14-2	Current from a battery dependent upon *resistance* of each cell	13	38
14-3	Current from a battery dependent upon the *number* of cells	20	57
14-4	Current from a battery dependent upon the *external* resistance	1	17
15-1	E. M. F.'s of cells determined by *materials*	1	70
15-2,3	E. M. F.'s of cells not dependent upon size or shape	16	45
	of the plates	6	29
15-4	A large cell will furnish more *energy*	13	6
15-5	A large cell equivalent to several small cells in parallel	9	42
16-1 (7-1)	A simple arc lamp consists of two *carbons*	39	84
16-2 (7-2)	A *current* passes between the two carbons of an arc lamp	39	78
16-3 (7-3)	The two carbons of an arc lamp must first be in *contact*	9	64
16-4 (7-4)	The two carbons in an arc lamp must later be *separated*	7	58
16-5 (7-5)	The light from an arc comes largely from the *positive* crater	6	28
17-1,2 (8-1,2)	The *filament* in an incandescent lamp is *heated*	17	36
		10	36
17-3 (8-3)	An incandescent lamp has a *high* resistance	25	67
18-1 (9-1)	Gas filled lamps have a *high* efficiency	32	62
19-1 (10-1)	The *mercury vapor* lamp is much used in photography	2	35
20	One method of finding resistance of a coil	1	24
21-1 (11-1)	Currents are commonly measured by *ammeters*	8	72
21-2 (11-2)	Ammeters are really *galvanometers*	1	29
21-3 (11-3)	Ammeters have *low* resistances	0	36
21-4 (11-4)	Ammeters are calibrated to read *amperes*	0	41
21-5 (11-5)	Ammeters are connected in *series* with lamps	0	43
22-1 (12-1)	E. M. F.'s are commonly measured by voltmeters	7	74
22 2 (12-2)	Voltmeters are *galvanometers*	1	24
22-3 (12-3)	Voltmeters have a *high* resistance	1	45
22-4 (12-4)	Voltmeters are calibrated to read *volts*	3	57
22-5 (12-5)	Voltmeters are connected in parallel with lamps	6	54
23-1 (13-1)	The current in a series circuit is everywhere the *same*	44	87
24-1,2 (14-1,2)	The current in a parallel circuit is the *sum* of those in the	9	60
	parts	4	28
25-1 (15-1)	The resistance of wires in series is *more* than any one	48	72
26-1	The resistance of wires in *parallel* is *less* than any one	28	75
27-1 to 27-4	Four devices utilizing heat from a current	59	92
		56	94
		51	92
		43	87
28-1 (16-1)	To find the current in a lamp of known voltage and resistance	1	50
28-2 (16-2)	To find the total current in lamps in parallel from voltage and resistance of one lamp	1	43
29-1 to 29-4 (17-1 to 17-4)	To find the respective currents in four coils in parallel, each resistance, and voltage of source, given	4	65
		4	66
		4	66
		4	64
29-5 (17-5)	To find the total current in 29-1 to 4	2	52
30-1 to 5	List all material needed in an experiment to determine power	9	66

Item		Percentages Pre-Test	Final Test
	consumption of a bank of incandescent lamps	8	69
	(These items indicate ability to name materials up to five	6	63
	things.)	5	47
		0	26
31-1,2	The *greater* the diameter of a wire the *less* the resistance	27	54
		23	52
32-1	To find the current capacity of a fuse to protect an electric range on a 115 volt circuit, with burners of known power	2	24
33-1,2	Knowledge of *indirect* and *semi-indirect* lighting	18	26
		4	8
33-3	Knowledge that direct lighting is most economical in power consumption	4	15
33-4	Indirect lighting best for eyes	15	12
33-5	Semi-indirect lighting probably most common	0	2
33-6	Semi-indirect lighting a good compromise	0	4
33-7	Indirect lighting most expensive	3	17
34-1 to 4	Four incandescent lamps in chronological development	6	30
		3	11
		3	18
		5	13
34-5,6	The aim is toward lamps of large candle power for *low* power	2	13
	consumption	15	40
34-7	The efficiency of incandescent lamps has *increased*	9	33
34-8	Early forms of incandescent lamps had efficiencies of about *3.5* watts per c. p.	6	2
34-9	Present incandescent lamps have *high* efficiencies	0	7
34-10	Present incandescent lamps have efficiencies as high as *.5* watts per c. p.	0	1

The following test items are those omitted from the Work-Test Book. The numbers correspond to those in the above list.

5. Cells are generally connected in X_1 or X_2. 1..... 2.....

6. An electric generator generates current by the X_1 of the armature in a X_2 field. 1..... 2.....

7. A primary cell furnishes a X_1 as soon as it is made; a secondary cell must first be X_2. The most common form of the latter is the X_3 cell, which has a voltage of approximately X_4 volts and X_5 internal resistance. It can thus furnish a X_6 current. 1..... 2..... 3..... 4..... 5..... 6.....

8. Four types of primary cells are the X_1 cell, the X_2, the X_3, the X_4. 1..... 2..... 3..... 4.....

9. The most common primary cell now used is the X_1 cell. It has a voltage of about X_2, and a fairly X_3 internal resistance. 1..... 2.....

10. A X_1 utilizes heat to produce electrical energy. 3.....

11. The units used in measuring current, E. M. F., and resistance are, respectively, X_1, X_2, X_3. 1..... 2..... 3.....

14. The current furnished by a battery is determined by the X_1 of each cell, the X_2 of each cell, the X_3 of cells, and the X_4 resistance. 1..... 2..... 3..... 4.....

15. E. M. F.'s of cells are determined by the X_1 and not the X_2 or X_3 of the plates. A large cell will furnish more X_4 and is equivalent to several small cells connected in X_5 .

26. The resistance of several wires in parallel is X_1 than any one.

27. Four electrical devices utilizing the heat produced by a current are X_1 , X_2 , X_3 , and X_4 .

30. List all material needed in an experiment to determine power consumption of a bank of incandescent lamps.

31. The X_1 the diameter of a wire the X_2 the resistance

32. A X_1 amp. fuse must be used to protect an electric range circuit having three 1000 watt burners, and two 1500 watt burners, on a 115 volt circuit.

33. Three types of lighting are the direct, X_1 , and X_2 . The first is the most X_3 in electric power consumption; X_4 is best for the eyes, and the X_5 is probably most common in residences. The X_6 has most of the advantages of the other two, eliminating their disadvantages. The X_7 is most costly.

34. Kinds of incandescent lamps used in chronoligical order are X_1 , X_2 , X_3 , X_4 . The aim is toward a lamp giving X_5 with X_6 power consumption. The efficiency has been getting X_7 . While the early forms had efficiencies of about X_8 watts per c. p., the late forms have efficiencies as X_9 as X_{10} watts per c. p.

It is noteworthy that instruction has produced a greater percentage of correct response to every item except one, item 15-4. Neither in the preliminary nor final is there a large percentage of correct response on this item. It is among the items omitted in Test VIII in the Work-Test Book. The important concept that a large cell has a greater capacity in ampere-hours than a small cell is considered in Unit XI in the specific references made to similarities and differences in 11-plate and 13-plate storage batteries. This is probably where it should be stressed, if it is desirable to stress knowledge which is most functional.

Are there any significances to be attached to the facts of few or many correct responses to these test items, which may be used in curricular development? Probably not many without additional interpretation. For example, it cannot be assumed that a large percentage of correct response is prima-facie evidence of the importance of the concept in question. It does show that something was done in instruction to bring about such a response if the final test shows a decided increase over the preliminary. Indirectly, it may give a clue to what teachers think of its importance. If few correct responses are given in the final test, for example, it indicates a lack of stress in the classroom. If the criterion of a large percentage of response were used alone, some of the concepts in regard to the use of primary cells would be of greater importance than those concerning the use of electric lights. For ex-

ample, the fact that a simple voltaic cell is composed of strips of copper and zinc immersed in dilute sulphuric acid, would, according to this criterion, be more important than the fact that the common voltage for incandescent lamps is about 110 volts.

In the early days of objective testing, the percentage of correct response was used as a criterion of *difficulty* of the test item. It can much more truly be used as a criterion of *emphasis* or *stress* given in instruction. For example, the method of expressing the efficiency of an incandescent lamp viz. in watts per candle power, is according to the first interpretation, a very difficult question, as it has received a very low percentage of correct response in every test in which it was included as an item. On the other hand, there is nothing intrinsically difficult about it. It is unusual and unique to express efficiency in this manner, but probably no one would dispute the statement that it may be taught if enough emphasis is given it.

Therefore, a logical explanation of the large or small percentage of response lies primarily in the attention paid to items in the proceedures of instruction. If an item receives almost no correct response in the preliminary test, and a very large percentage in the final test. it shows the effects of instruction certainly. If it shows no increase from preliminary to final, it denotes *little* or *ineffectual* instruction.

To be sure, it is true in a few instances in the test items given above, that a low percentage of correct response was due to failure to recognize a preceding fact. For example, a pupil may not have known that an ammeter was used to measure electric current (Item 21) so that he would fail to make a correct response to the concept that an ammeter has a low resistance, which concept is included in the same sentence. It is obvious that this item should be reworded to make sure of the implication that a pupil does or does not know that an ammeter has a low resistance.

If all of the test items are important, it is also important that they receive large percentages of correct response in the final test. Judgment of importance must be based on something more than the percentage of correct response, however. At least two criteria may receive attention, viz. (1) that of the importance of the concept in understanding larger concepts to which it is subsidiary; or (2) that of the functional importance to people in their everyday lives. The distinction stressed here is that of intellectual satisfaction versus utility. The two are not mutually exclusive, to be sure, but each represents a rather distinct point of view held by many individuals.

The items may be considered from these viewpoints by first considering those which were omitted from the Work-Test Book. This makes selection a matter of *relative* importance. The size of the Work-Test Book was a limiting factor to a certain degree. Therefore, it became necessary to select those things considered more important. This may be the clue to much of our future curriculum revision. Selection of the more important items of instruction from the great mass of available material is the job of the curriculum investigator. All knowledge, techniques, appreciations, habits, and skills are important to some one. For any *general course given to non-homogenous groups* inabilities, interests and vocational expectancies, the selections must be those likely to give the greatest good to the greatest number. Provisions may of course be made to take care of individual differences to some extent. Objections to the selections in the present instance will give some basis for further selection.

It may be noticed that the test items omitted are almost entirely concerned with primary cells. Item 6 is included in Unit IX on "Electrical Generation and Transmission." Item 10 concerns the thermo-couple which is of little importance in electric lighting. Item 11 is essentially included in other retained items. Item 26 is included in the unit itself but is cared for by inference in 25-1. Item 27 is fairly well cared for without specific instruction. It is, however, included in the unit outline. Item

30 is concerned with a technical experiment, thought less important than other retained items. Items 31, 32, 33 and 34 were omitted in the test but have been retained in the unit outline.

The unit outline gives more indication of what was considered essential. While the test parallels the outline in general, there were some items in the outline not touched on in the test. The following items in the original outline were finally eliminated:

1. Describe briefly the development of the electric cell beginning with the simple voltaic cell.
2. Explain different methods of connecting two or more cells to form a battery.
3. Explain the general conception of an electric generator.
4. Explain the difference between a primary and secondary battery giving some concrete examples of the use of each.
5. Tell what a thermo-couple is and, illustrate its use by one concrete example.
6. List the factors determining the electromotive force of (1) a primary battery; (2) a storage battery.
7. Explain one method of finding the resistance of a coil of wire.
8. Experimentally determine (1) the resistance of a lighted incandescent lamp; and (2) 6 incandescent lamps in parallel.
9. Experimentally determine the power consumption of one incandescent lamp, 6 incandescent lamps in parallel, and an arc lamp circuit containing a rheostat.
10. Experimentally determine the cost per hour of one or more incandescent lamps, a flat iron, percolator, vacuum cleaner or other electric device.
11. Find the resistance of a coil of 18 ft. of copper wire .03 inches in diameter. Find the resistance of the same amount of iron wire.
12. Find the current furnished by three storage cells each having an E. M. F. of 2 volts, through a resistance of 5 ohms, assuming the internal resistance of each cell to be 0, and connected in series.
13. Find the current furnished by the same cells as in (12) if connected in parallel.
14. Find the answer to the question, "Under what conditions should cells be connected in series and in parallel, respectively?"
15. Prepare a short theme on any one of the following: Ohm, Volta, Faraday, Edison, Steinmetz.
16. Make a list of proper rules to follow in using electric lights for reading.

The most outstanding omissions are those referring to primary cells and batteries—items 1, 2, 4, 6 and 14 in the list. These items were included originally because they represented steps in the historical development of sources of electrical energy. If we follow the criterion of selecting materials of large functional value, much of the material on primary cells may be omitted. Relatively, they are unimportant to this unit. The unit is concerned with electric lighting, and there is no reason for including much content on primary batteries. Certainly, it seems unnecessary to teach the principles of cells, polarization, local action, their historical development, the effects on voltage, resistance, and current of connecting cells in various manners, and so on, when cells are used very little nowadays. It may be well to make reference to cells, especially the dry cell, but detailed studies seem unwise *if there are many more important things being neglected.* As stated before, they are not vital matters of concern in electric lighting anyway.

Items 4, 12 and 13 refer to secondary cells. These are taken care of in Unit XI, "The Storage Battery and Electrochemistry."

Item 3 is included in Unit IX, "Electrical Generation and Transmission."

Item 5 is omitted as relatively unimportant in electric lighting.

Items 8, 9 and 10 are experimental. Very few experiments are included under "Common Activities for All Pupils." In general, these have been placed under "Suggested Project Work" and left to the discretion of the instructor, and the dictates of equipment and circumstances.

Item 11 is not essential to this unit.

Item 15 is omitted but references to Volta, Faraday and Ohm are made in Unit VII. Other references containing much biographical material are given in many units.

Item 16 is important but is cared for in Unit XII where specific references are made to the eye.

The reasons for the elimination of certain items originally included are evident and probably will not be disputed. While conventional text books of physics commonly include some of the omitted material, the unit as conceived and outlined is undoubtedly made more coherent by the omissions. If time is available, and pupils are capable, additional material may always be added. The "Suggested Project Work," and "Supplementary Reading" lists make many suggestions. Test scores so far made on Test VIII indicate that desirable achievements covering the "Common Activities for All Pupils," have not generally been reached. More concentration on these essentials seems to be necessary. The wisdom of including essentials only in the "Common Activities for All Pupils" is apparent.

If it be accepted that the omissions made were based on sound logic from the standpoint of this particular unit, it may be in order to justify the retention of the remaining items on the basis of (1) the ultimate sociological aims and (2) the more immediate objectives stated as (a) knowledge, (b) techniques, (c) attitudes or appreciations, and (d) habits or skills.

The ultimate aims stated at the beginning of the revised unit are as follows: exploratory-vocational, avocational, social, and health. In what ways do these receive consideration?

Attention is directed to all of these aims in the introductory statement given after the unit title. The implication is that the reasons for pupils learning about electric lighting systems are that they may possibly see vocational and avocational opportunities for themselves in the field; that they may realize that electric light systems are social institutions and that better health and sanitation may be secured through the proper use of electric lights. The first three items call attention to our sources of electric energy, with some essential details concerning them. The fourth item refers to primary cells as a step in the historical development of sources of electrical energy. Items 5 to 11, 14 to 20, and 23 to 30 inclusive, are more purely technical items intended to develop certain understandings about the electrical theories underlying electric lighting. Items 12 and 13 refer to types of arc and incandescent lamps. Item 21 calls attention to other applications of heat from electricity most of them useful in the home. Item 22 calls for a list of vocational possibilities in the field. Item 31 calls for a list of reasons why an electric power system is a social institution. Item 32 directs attention specifically to health and economy in lighting. Item 33 compares incandescent lights in convenience and economy. Item 34 calls attention to future possibilities in lighting. Item 35 is one referring to the health objective, i. e., provisions to eliminate danger to consumers. The unit is planned with the concept in mind that the four ultimate aims will be furthered through the pupil activities listed—more especially so if the instructor keeps these aims in mind and makes constant references to them. The understandings developed by the more technical items are thought essential elements in the accomplishment of the aims stated.

How are the activities related to knowledge, techniques, appreciations, habits and skills?

In stating each activity, consideration was given to the specific primary purpose of the activity. Is it primarily a pure knowledge or information item, necessary as an initial or intermediate step? Is it primarily a technique which is desirable? Is it primarily intended to develop an appreciation? Is it intended to help in producing a habit? In the first draft, the various activities were listed under the first three headings. No reference was made to any specific habits or skills, the inference being that these are developed through repetition and drill.

These are largely cared for in everyday life. If the material is functional, the repetition and drill will be provided automatically.

In the Work-Test Book no classification of items under these headings is indicated though it is recommended that these be supplied by the instructor. It helps the instructor in planning his part in the program of instruction, to know what should be emphasized in connection with each item. Is an item purely informational; has it appreciational elements involved in it; is a technique the particular objective? To be sure, all involve informational elements but the point is that this is very much more incidental in some cases than in others. If one examines each item in the final list of activities, it will probably be easy to select the specific items of appreciation and technique. To make this easier especially with the techniques, it will be well to know that the general technique emphasized is that of problem solution. In Units II and III, specific items calling attention to general steps in problem solution are given. This work is intended to lay the foundations for work in succeeding units. Wherever a problem is given, the pupil is called upon to give his method of solution. In other words, the *method* used in solving a problem is continually emphasized. This is intended to help in developing ability to "think scientifically" which is naturally classified as a technique. The appreciations stressed are: appreciation of heat production by electric currents; appreciation of the electric power company as a social institution; appreciation of the relation of lighting to health; and appreciation of the present tendencies in electric lighting and the goals toward which research in lighting is moving.

What further procedures with regard to developing Unit VIII are desirable?

The logical step is to use the revised unit in instruction, and the revised test for testing purposes. Higher levels of achievement should be attained on the smaller core of essential material. Fifteen experiments were carried on last year with some variations in method. Two contrasted lecture and supervised study method; thirteen contrasted work-book and no work-book methods. These experiments are reported in another article.[4] The experimental use of different methods of instruction is desirable in order to collect more objective data on method. Better techniques of experimentation and more careful *control* or *evaluation* of determining factors of achievement are necessary.

The opinions of instructors using the units in 1929-30 were collected. They have been summarized in another article.[5] More extensive collection of such opinion is essential. A wise plan of experimentation would assign definite experimental projects to certain schools where enough freedom would be given so that experimentation could be thorough and decisive.

For the school year 1930-31, a series of experiments with Unit VIII has been devised, which may be tried out without cost by any instructor who will apply for the materials.[6] Directions for the experiments are given below but may be modified if the instructor so wishes. Revised work-sheets, a teacher's outline or syllabus, and revised test forms will be supplied by the Institute until the supply is exhausted. The only requirement is that materials be returned to the Institute so that necessary comparisons may be made and a comprehensive report prepared.

Directions for Experiment I Dealing with Unit VIII

Purpose: To determine the effects on achievement records of increasing the time spent on instruction.

Plan: 1. Before this unit is taught, the class should have had no instruction in electricity except static electricity. (This does not refer to instruction in general science or special industrial courses.)

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[4]Unpublished, but manuscript available.

[5]This article appears elsewhere in this issue of the Quarterly.—The Editor.

[6]Apply to A. W. Hurd, Institute of School Experimentation, Teachers College, Columbia University.

2. The preliminary test shall be given before any instruction on the unit. Care and time shall be taken to have the pupils do as well as possible on this preliminary test. (This test is supplied by the Institute.)

3. After the preliminary test, the unit shall be introduced by the instructor by reading, with the pupils, the introductory statement given on the work sheets supplied by the Institute. A short time may be taken for an informal discussion of this statement. The instructor shall then give the pupils a general overview of the unit showing them what is expected of them in common. (List of common activities for all pupils.) In addition to common requirements, it shall be made clear that each pupil *may* carry on a project. This may be selected from the list of suggested projects or it may be a report, written or outlined, on some periodical or book reference. Some books are listed in the supplementary reading list. Any other project approved by the instructor may be carried on.

4. All work shall be done during the class periods excepting project work.

5. Lessons shall be assigned from the work-sheets at such a rate that the work is covered at the end of fourteen class periods. *This includes the time taken for the overview but not the time taken for the preliminary test.*

6. The class time shall be occupied with text-book or other pertinent reference reading; carrying on the activities listed on the work-sheets; discussion of the work done on the work-sheets; explanations as seem to be needed by the pupils; and any demonstration or laboratory work thought necessary to clarify conceptions.

7. The following demonstrations or laboratory experiments shall be performed by the instructor or by pupils:

A. Set up a lamp bank consisting of incandescent lamps. Preferably use lamps of different types (carbon, tantalum, tungsten, gas-filled) and of different sizes (15, 25, 40, 50, and 60 watts). Take several ammeter and voltmeter readings to show the current and voltage for individual lamps and two and more in parallel.

B. Exhibit and discuss several types of primary cells.

C. Set up a *series* of small lamps similar to a Christmas-tree outfit and show *how* and *why* the lamps are connected as they are. Take ammeter and voltmeter readings to show the effects of connecting lamps in *series*.

D. Properly connect either a bank of incandescent lamps, an arc lamp, an electric toaster, flatiron, or other household device, with an ammeter and voltmeter, and find the power in watts and the cost per hour.

E. Demonstrate and discuss an arc light, if available.

8. The instructor or a capable pupil shall give a talk on the prevention of fire due to improperly installed electric wiring, in which reference shall be made to electric wiring codes.

9. Care should be taken to give the pupils at least *eight full class periods* for individual work on their work sheets.

10. No prolonged drill work shall be conducted during these fourteen class periods.

11. At the end of this time, Final Test Form A shall be given.

12. Test papers should be scored and special note made of (1) total scores on the test, and (2) special test items receiving small numbers of correct response.

13. Six additional class periods shall be used for the following:

A. Special drill on the points showing a low number of correct response. Many problems from available text books may be used for this drill or original problems may be given by the instructor.

B. Question and answer exercises to make clear misunderstood points may be carried on.

C. Short tests covering type difficulties may be given.

D. If there are few difficulties disclosed, class time may be given for project work; or for additional laboratory work; or for reports which have been prepared by the pupils.

E. During the seventh additional period, Final Test Form B shall be given.

14. All tests shall be scored at the school from keys furnished by the Institute, and the records sent to the Institute on the special report blanks supplied. (Upon special request, the papers may be scored at the Institute.)

Directions for Experiment II Dealing with Unit VIII

Purpose: To contrast a conventional text-book—recitation method with a specialized work-sheet method.

Plan: 1. Before this unit is taught, the classes shall have had no instruction in electricity except static electricity. (This does not refer to instruction in general science or special industrial courses.)

2. In order to make this experiment of any value, great care must be taken to prevent transfer from the experimental method to the control method through the instructor. In the first place, the experimental classes and the control classes must be selected. This experiment is possible only in schools in which classes are formed at random. For example, if classes are formed on some particular basis, as X, Y, and Z groups, or boys and girls, or any similar criteria, this experiment is not worth trying. But in schools where classes are formed practically at random, experimental and control classes may be chosen with great probability that the classes will be fairly well matched, or that the elimination of a few from either class will match them.

In the second place, the same teacher must instruct both experimental and control classes. He must be very careful, however, to teach the text-book—recitation group as nearly as he can judge, in the general manner which he used with his classes before he used a work-sheet method.

3. The text-book—recitation method shall be as follows:

A. Assign regular page to page lessons in the text-book each day. Let the class recite on the material the next day, the object of the instructor being to get the pupils to understand the material covered in the text book. *Do not omit* any paragraphs in the text and do not consciously emphasize any part of the text at the expense of any other part. The time to be spent is *eighteen class periods of 45 minutes each or their equivalent for both experimental and control classes.* The text book references shall be divided into fifteen equal assignments, to be assigned each day. All work shall be done during the class periods excepting project work.

B. The first period (of the total of eighteen) a preliminary test furnished by the Institute shall be given. (This is also given to the experimental classes.)

C. Any laboratory experiments *which you have been in the habit of giving in connection with this subject matter shall be given as usual. This applies equally well to the demonstrations.*

D. In addition each pupil is required to pursue an individual project of some kind and make some report upon it in writing or in some other concrete manner. This is to be completed by the end of the eighteen class periods.

E. The teacher must exercise all possible care to prevent himself from suggesting in the control classes any concept or activity suggested to him because he is teaching also the experimental classes. This will work itself out fairly well if he conducts the control classes earlier in the day and remembers that these classes are merely trying to gain a clear comprehension of all the paragraphs given in the text book.

F. The page references in five commonly used text books to be covered in assignments are as follows:

Black and Davis (edition 1929), pp. 319-357; 360-363; 377-396.

Carhart and Chute (edition 1927) pp. 377-388; 394-405; 413-418; 440-442; 457-62.

Duff and Weed (edition 1928) pp. 435-445; 461-476; 488-497; 511-512; 520-21.

Dull (edition 1929) 537-55; 583-613; 622-23.

Fuller, Brownlee, Baker (edition 1925) pp. 405-19; 423-66; 501-9; 514-16; 530-32.

Millikan, Gale, Pyle (edition 1927) pp. 263-67; 276-79; 283-302; 307-11; 320-21.

If other texts are used, consult with the Institute for page assignments. *But one text is to be used for assignment purposes.*

G. During the seventeenth period, Final Test Form A is to be given. During the eighteenth period, Final Test Form B is to be given.

H. All tests are to be scored at the school from keys supplied by the Institute. (On special request, scoring will be done at the Institute.)

4. The specialized work-sheet method shall be as follows:

A. The first period (of the total of eighteen) the preliminary test furnished by the Institute shall be given as with the control classes.

B. Work sheets supplied by the Institute shall serve as a basis for the experimental classes. Each pupil shall have a work-sheet.

C. After the preliminary test the unit shall be introduced by the instructor, by reading, with the pupils, the introductory statement given on the work-sheets. A short time may be taken for an informal discussion of this statement. Special reference shall be made to the ultimate aims given for the unit. The instructor shall then give a general overview of the unit, showing the pupils what is expected of them in common. (List of common activities for all pupils.) In addition to common requirements, it shall be made clear that each pupil may carry on a project. This may be selected from the list of suggested projects, or may be a report, written or outlined, on some periodical or book reference. Some books are listed in the supplementary reading list. Any other project approved by the instructor may be carried on.

D. A teacher' outline or syllabus furnished by the Institute will serve as an additional guide.

E. Lessons shall be assigned from day to day from the outline, and the attentions of pupils shall be directed to the text-book references given on the work-sheets immediately following the introductory statement. The corresponding work-sheet exercises shall be completed each day. The work-sheets should be complete before the final test is taken the seventh class period.

F. During each of the class periods not used for preliminary and final tests, portions of the work-sheets shall be discussed, care being taken to have corrections made so that finally, each pupil's work-sheet is correct. (A key will be supplied by the Institute for this purpose.) All work is to be done during the class period excepting project work.

G. The following *demonstrations* or *laboratory experiments* shall be performed:

(a) Set up a lamp bank consisting of at least five incandescent lamps. Preferably use lamps of different types (carbon, tantalum, tungsten, gas-filled) and of different power (15, 25, 40, 50 and 60 watts). Take several ammeter and voltmeter readings to show the current and voltage for individual lamps and two and more lamps in parallel.

(b) Exhibit and discuss several types of primary cells, including a dry cell.

(c) Set up a series of small incandescent lamps similar to a Christmas-tree outfit, and discuss *how* the lamps are connected and *why* they are connected as they are. Take ammeter and voltmeter readings for one and several lamps to show the effects of connecting lamps in series. Discuss the voltage, current, and resistance relationships for one, two, and several lamps.

(d) Demonstrate the effect of a current above and below a magnetic needle to illustrate the principle of a galvanometer. Exhibit and discuss the movable needle and movable coil types of galvanometer, and explain how ammeters and voltmeters are modified galvanometers.

(e) Properly connect, either a bank of incandescent lamps, an arc lamp, an electric-toaster, flatiron or other household electric device with an ammeter and voltmeter, and find the power in watts, and the cost per hour.

(f) Demonstrate an arc light, if available, and explain how it is lighted and the purpose of the rheostat.

H. During the seventeenth period, Final Test Form A shall be given; and during the eighteenth period, Final Test Form B.

4. All tests shall be scored at the school from keys furnished by the Institute, and the records sent to the Institute on the special report blanks supplied. (Upon special request the papers may be scored at the Institute.)

It must be re-emphasized that this will be no experiment unless the two distinct points of view are rigidly adhered to by the teacher, viz., that in the control class, the text-book is the guide and source of information; while in the experimental class, the outline and work-sheets serve to organize the work.

Directions for Experiment III Dealing with Unit VIII

Purpose: To increase achievement scores on the tests by the use of all the devices at the command of the instructor *except* drilling on the test items themselves.

Plan: 1. Before this unit is taught, the class shall have had no instruction in electricity except static electricity. (This does not refer to instruction in general science or special industrial courses.)

2. The preliminary test shall be given before any instruction on the unit. Care and time shall be taken to have the pupils do as well as possible on this preliminary test. (This test is supplied by the Institute.)

3. After the preliminary test, the unit shall be introduced by the instructor by reading, with the pupils, the introductory statement given on the work sheets supplied by the Institute. A short time may be taken for an informal discussion of this statement. Special reference shall be made to the ultimate aims given for the unit. The instructor shall then give a general overview of the unit, showing the pupils what is expected of them in common. (Common activities for all pupils). In addition to common requirements, it shall be made clear that each pupil may carry on a project. This may be selected from the list of suggested projects, or may be a report, written or outlined, on some periodical or book reference. Some books are listed in the supplementary reading list. Any other project approved by the instructor may be carried on.

4. All work shall be done during the class periods excepting project work.

5. The teacher's outline furnished by the Institute, together with the pupil's work-sheets shall serve as the basis for daily work. Topics and text-book references (see work-sheets) shall be assigned from day to day, and portions of the work-sheets should be filled in. Divide the work into fifteen equal parts so that all is completed at the end of the fifteen periods following the preliminary tests.

6. During the fifteen periods such other activities may be carried on as the instructor sees wise and necessary, to bring about mastery of the topics. Demonstrations, laboratory work, or other exercises shall be planned by the instructor but always to build up and clarify the listed concepts in the minds of the pupils.

7. A daily log of teacher and pupil activities shall be kept and sent to the Institute with the other records.

8. Final Test, Form A shall be given during the seventeeth class period, and Form B during the eighteenth period.

9. All tests shall be scored at the school from keys furnished by the Institute, and the records sent to the Institute on the special report blanks supplied. (Upon special request, the papers may be scored at the Institute.)

10. A capable pupil may be detailed to keep the log to which reference is made. It is recommended that two pupils keep a log so that each may serve as a check upon the other. This log will be a very important document, indicating to a considerable degree, any particular activities making for high achievement.

PART III. TEACHER OPINION ON PROBLEMS OF SCIENCE TRAINING

The problems of science teaching may be solved satisfactorily only after a study of the children being taught, for the problems arise in actual teaching situations. When courses have been carefully planned, attempts to put them into practice may not result in fruitful achievement, because of pupil factors determining achievement for which provisions may not have been made. Instructors who are "in the front lines" are forced to meet the actual teaching situations and should be able to give invaluable testimony concerning teaching problems and the possibilities of their solution.

This article contains suggestions from teachers who had made use of one or more teaching units in high school physics and who gave responses to certain questionnaire items addressed to them. The teaching units were those prepared for experimental use by the sub-committee on physics of the Committee on Standards for Use in the Reorganization of Secondary School Curricula, of the North Central Association of Colleges and Secondary Schools.[1] The suggestions should receive the attention of teachers of science and curriculum builders because they introduce evidence secured under actual teaching conditions by those meeting the everyday situations which arise in the classroom.

The items will be considered in the order in which they occurred on the questionnaires and some attempts will be made to interpret their significance.

Tentative time limits had been set for the experimental trials of the units, and the first item referred to the adequacy of the limit set. The question to which answers were sought was whether the time set was sufficient or insufficient. Of 35 replies, 25 replied in the affirmative and 10 in the negative. On the basis of the specified times set for the nineteen teaching units given, 10,600 minutes of instructional time would be required. Counting a school year of ten months or forty weeks, 10,000 minutes would be available.* This would be inadequate on the basis of a forty-week year. The added discrepancy caused by a thirty-six week or nine-month year would be great. In view of the fact that ten of thirty-five teachers thought the allotted time insufficient, it is rather clear that teachers generally should not try to teach all nineteen units in the average school, unless many of the units are shortened considerably.

In other words, teacher opinion seems strongly to suggest the probability that the present content of high school physics of which the nineteen units represent only a part, is too inclusive. This opinion is supported by evidence of inadequate achievement records.[2] A generalization on this phase is not out of place here and may be stated as follows:

Under present conditions and ideals of secondary school instruction, the course in high school physics covers too much content for the average pupil enrolled in the average public high school.

Each of the teaching units to which reference has been made contains suggested project work in addition to common activities for all pupils. This phase is in accordance with modern conceptions of caring adequately for individual differences of pupils. It was presumed that every pupil if possible, should engage in some individual project work, to be planned and carried out by himself and in his own way.

The questionnaire sought to determine to what extent pupils carried on the suggested projects or others which they might have chosen. Eighteen replies reported extra projects by some pupils. Fourteen replied in the negative. Replies were not complete in many cases. The only deduction possible is that some project work is being carried out in some schools but that the practice is not universal in the course in physics. Appar-

[1] See *Reorganization in Physics* in the N. C. A. Quarterly for September, 1929.

[2] A. W. Hurd. *What are Girls and Boys Getting from their School Courses in Science?* Teachers College Record 31; 642-47, April, 1930.

*A week of five 50-minute periods.

ently it is an inconsistent and spasmodic practice. This is not surprising for the comments made refer often to the lack of time for individual project work. In other words, if the prescribed course is too long, the addition of individual project work makes the time allotment all the more inadequate. A second generalization is pertinent to the effect that:

Under present instructional conditions and ideals, the average pupil enrolled in physics in the average public high school has no time for additional project work.

The question of method is always interesting. The questionnaire sought to discover the methods being used in the teaching of physics. The following were designated. The number of replies is shown after each:

Recitation—laboratory—demonstration	9
Completely supervised study	2
Supervised study—discussion—laboratory	1
Lecture—discussion	2
Completely individualized instruction	2
Supervised study—discussion	1
Individualized instruction with demonstration	1
Contract system	1
Combination	18

The responses show that it is difficult to specify one's method, unless a given method is actually specified in advance, as for example, the contract system. Even then, the chances are that the method specified includes others which may be analyzed out. Methods never have been clearly defined but there is hope of such definition by specifications such as are given above. These represent, however, only steps in the right direction. A further discussion of this matter[3] shows that there are *pupil* and *teacher* elements of instruction which should be more clearly differentiated. The only generalization possible from the questionnaire replies is as follows:

Most teachers of high school physics use procedures which must be classified as a multiplicity or combination of methods. Analysis is necessary to break them up into their elements.

An item of the questionnaire asked for details of method used which were novel or unique. Many teachers denied any novel or unique method but several contributed the following which are suggestive:

Questionnaire replies substituted for laboratory note books.
Pupils performed experiments with apparatus constructed by themselves.
Each pupil made some kind of a report.
A thoroughly planned testing program.
Daily question lists for home study.
A note book on each unit.
Pupils brought in apparatus from junk yards and demonstrated them.
A work book scheme.
Preview of unit given by the teacher.
Visits to oxygen and hydrogen manufacturing plants, plating plants, etc.
Diagrams drawn.
Class visited a motion picture house, heard a demonstration of the vitaphone and wrote up the trip.
Put life into assignments by reference to modern industry.
Contract method.
Used pre-test to launch the study of the unit—each pupil copied the items in which he was most interested.
Pupils formulated their own bibliography.
Pupils formulated the guiding outline.
Pupils suggested the study of vibrating strings, formulated and tested their own laws.
Pupils kept lists of new terms encountered.
Pupils took imaginary trips.

These statements show that teachers are actually making some trials of new schemes and are looking for suggestions which may prove to be of worth. When it came to giving suggestions for the omission or addition of items in the nineteen units mentioned, however, very few were made. In general, the materials did not excite opposition.

A question was asked concerning the amount of study outside of class. Thirty-

[3] Unpublished.

four replies indicated that study was required, and three that study was not required. The time ranged from no specified time to two hours, the majority giving one class period as the expected time.

A question concerning definite times set aside for laboratory and class periods was also asked. Twenty replies indicated a division usually three days for recitation and two double periods for laboratory. Eight replies indicated no division, intimating that laboratory or recitation was carried on as needs arose. This last tendency perhaps shows an inclination to aim toward definite goals, the activities being chosen which will accomplish the goals, regardless of definite time divisions. This is undoubtedly a correct attitude, as there is no logical reason for having three days of recitation and two days of laboratory, except administrative convenience.

The questionnaire again sought opinion on whether a course covering the entire field of conventional physics or an intensive course on a few selected units was desirable. Eleven replies favored the former, and twenty-one the latter. Apparently most teachers are convinced that the present, rather conventional course is too long, and results in superficiality.

A final point concerned whether the course in physics should be developed around daily life applications or physical principles. Twenty-seven replies favored the former, and six, the latter. This indicates a decided tendency toward agreement that the course should be developed around everyday applications of physics. This tendency does not at all preclude the teaching of physical principles. It intimates merely that pupils are more likely to be interested in the applications than in the principles themselves. Or, stated differently, they are interested only indirectly in the principles to the extent that they serve to explain their applications. The concrete is more attractive than the abstract to most boys and girls and the abstract is naturally only understandable through an understanding of the concrete. If it be desired finally that a degree of abstractness be secured by each pupil, this will be possible only through the presentation of many concrete situations, a noting of identifiable similarities, and an abstraction of these similarities to form a law or principle.

Perhaps a reason for some of the inadequacies of present science teaching lies in the failure to present enough of the concrete so as to make abstractions understandable. This takes time. *Time is an element which must be considered,* though there are always chances that a wealth of experiences may be presented in less time.

Summary

The following statements summarize the apparent generalizations which may be ranked as hypotheses in view of the relatively small number of responses upon which they are based.

1. Under present conditions and ideals of secondary school instruction, the course in high school physics covers too much content for the average pupil enrolled in the average public high school.

2. Under present instructional conditions and ideals, the average pupil enrolled in the average public high school has no time for additional project work.

3. Most teachers of high school physics use procedures which must be classified as a multiplicity or combination of methods. Analysis is necessary to break them up into their elements.

4. Most high school teachers of physics are looking for new suggestions in method and content but few seem to have many definite original suggestions of their own.

5. There is perhaps a slight tendency toward the formulation of objectives, stated in such a manner that methods to accomplish them are automatically evident. (This does away with set times given for such procedures as recitation, laboratory, and the like.)

6. A rather intensive concentration upon a few selected units of instruction is probably preferable to a plan which attempts to cover the whole field of logical physics.

7. In order to appeal to the average student in the average public high school, the course in physics should be planned to definitely explain common things in the pupil's environment.

Under any circumstances, it seems wise to follow the implications of the statements given above, and determine by actual experimental trial the outcomes of such implications. An improvement in achievement records, and in feelings of satisfaction on the parts of teachers and students would be the criteria for use in judging the wisdom of such a course.

CO-OPERATING TEACHERS

In conjunction with the experimental work being carried forward by Dr. Hurd and his Committee on the Teaching of Physics a goodly number of secondary school teachers have contributed valuable cooperating services. The list of those to whom the experimental materials were sent and who, up to January 17, 1931, had returned reports to the Committee headquarters, is as follows:

O. E. Loomis, Rockton, Illinois
Margaret Franken, State Teachers College, Maryville, Missouri
Mitchell Bjeldanes, Sheboygan Falls, Wisconsin
R. L. Hunt, Madison, South Dakota
C. A. Brothers, Dwight, Illinois
Doris A. Griffoul, Barnesville, Minnesota
W. H. P. Huber, Elgin, Illinois
Miss Julia Seipel, Duluth, Minnesota
W. Edgar Glenn, Cambridge, Ohio
Ernest Hays, Hammond, Indiana
H. A. Wolcott, St. Paul, Minnesota
Arthur L. Epstein, Peoria, Illinois
Carl J. Stringer, Cleveland, Ohio
Henry J. Rohde, Minneapolis, Minnesota
Mr. J. R. Huston, Minneapolis, Minnesota
O. E. Bakke, Cannon Falls, Minnesota
S. E. Lund, Minneapolis, Minnesota
J. V. S. Fisher, Minneapolis, Minnesota
N. J. Quickstad, Mountain Iron, Minnesota
F. W. Brown, Cleveland, Ohio
T. Wrage, Madison, South Dakota
S. J. Becker, New Glarus, Wisconsin
E. S. Kromer, Two Rivers, Wisconsin
J. H. Stillman, Waterford, Wisconsin
S. D. Bishop, West Chicago, Illinois
R. A. Misch, Akron, Ohio
H. Gonzales, Chicago Heights, Illinois
H. M. Lyon, Chippewa Falls, Wisconsin
W. R. Bussewitz, Horicon, Wisconsin
G. M. Morrissey, Chilton, Wisconsin
R. H. Licking, Kewaunee, Wisconsin
H. S. Greischar, Kaukauna, Wisconsin
N. A. Kaste, Baldwin, Wisconsin
Karl Evert, Marinette, Wisconsin
C. R. Lundsten, Peru, Nebraska
A. J. Dean, Sault Ste. Marie, Michigan
Henry Bargen, Hudson, Wisconsin
C. W. Claflin, Neillsville, Wisconsin
A. C. Chambers, Delavan, Wisconsin
Arthur Simpson, Beaver Dam, Wisconsin
L. E. Sjostrom, St. Croix Falls, Wisconsin
P. D. Hale, Sturgeon Bay, Wisconsin
Rex Sims, Racine, Wisconsin

—The Editor.

The Course in High School Chemistry: A Progress Report[1]

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In the spring of 1929, a trial was made in twenty North Central Association high schools of an experimental unit in chemistry prepared under the auspices of the Committee on Standards for Use in the Reorganization of Secondary School Curricula.

The preparation of the unit in question followed studies (1) to determine the specific subject matter that should be included in a course in high school chemistry if the standards already adopted by the Committee should be allowed to govern the selection, and (2) to determine the most desirable organization of such material for instructional purposes.

In connection with the first of the two studies referred to above, it had been found that a considerable part of the material ordinarily included in such a course might be omitted without apparent disadvantage, but that on the other hand much that should be included, if the standards mentioned were actually to be observed, has instead been generally omitted in the past. An outline of the proposed material for the reorganized course was published in the Quarterly for March, 1927.

The second of the studies alluded to had led to the conclusion that perhaps all of the desirable factual material for the course in high school chemistry might be included under fourteen divisions, or units, bearing some such titles as those below:

1. Chemical changes in everyday life.
2. Elements, the simplest form of matter.
3. The ten elements necessary to life.
4. Some simple compounds of the essential elements.
5. How simple compounds combine to form others.
6. Some other useful and interesting elements.
7. The relation of chemistry to human health.
8. Uses of chemistry in the home.
9. Applications of chemistry in our daily life.
10. How chemistry is applied in the industries.
11. How chemistry contributes to the welfare of society.
12. The chemistry of plant and animal life.
13. The relation of chemistry to the progress of civilization.
14. Generalization and the solution of problems.

The experiment reported in this article was made to determine the probable reaction of teachers and students of high school chemistry to material selected and organized in the manner contemplated by the Committee.

Necessarily it was limited to a single unit chosen from the list above. The one finally decided upon was the seventh, *The Relation of Chemistry to Human Health.* As will be readily seen, this is, in a strict sense, a unit in applied chemistry. It follows that the technical factual material, whose applications are taken up, have been previously studied and should not therefore be included in it. Rather, the purpose of the study is to develop facility

[1]This is still another of the curriculum studies that is being carried on by the Committee on Standards for Use in the Reorganization of Secondary School Curricula under the authorization of the Commission on Unit Courses and Curricula. See page 442 for price of reprints of this article.—The Editor.

or skill in the actual use of this knowledge in the common situations of life. Moreover, it is equally apparent that the unit in question may properly include material whose function is to establish desirable attitudes toward the science of chemistry and also toward the conservation of human health.

It was soon discovered that only a small part of the necessary subject matter was to be found in the texts available to high school classes generally. The only practicable solution of this difficulty seemed to be to write the material in text book form, to publish it as a booklet for class use, and to distrbute these booklets gratis to both teachers and pupils in the classes in which they were to be used. Accordingly, this plan was followed. The text of the booklet as prepared and distributed follows:

THE RELATION OF CHEMISTRY TO HUMAN HEALTH

The degree in which human health is dependent upon chemical processes becomes apparent when we note that virtually all of the mysterious phenomena, which occur constantly within our bodies, and upon which our lives depend from hour to hour, if not indeed from moment to moment, are purely chemical in nature.

The food that we eat becomes the flesh, bones and blood of our bodies. Some of it, too, combines with oxygen in our blood, forming the invisible gas, carbon dioxide, CO_2, which presently escapes from our bodies through our lungs; and since this particular chemical reaction produces the heat and physical energy which are necessary to life, we could not live long if it should cease. The salivary glands, the pancreas, the liver and all other glands of the body, of which there are many, have for their sole function the manufacture of new chemical substances apparently necessary to the processes of life and health. If disease-producing bacteria find their way into our bodies, they likewise produce new substances which are poisonous to us and which often cause death. Yet from these treacherous poisons, nature protects us; for it commonly, even usually, happens that still other chemical substances, which are poisonous in turn to the invading bacteria, mysteriously appear when most needed in our blood and destroy the germs before they can put an end to our lives.

Within our bodies, then, a multitude of chemical reactions are constantly taking place. But for these, our lives would quickly cease, so completely do we depend upon these unfelt and unsuspected changes going on within us.

Chemical Knowledge a Means to Better Health

By the application of chemical knowledge, we are able in large measure to regulate our health. Physicians, as we know, make effective use of medicines, serums and the like, which are really chemical compounds, in the treatment of disease. However, a knowledge of chemistry is as helpful in the maintenance of health as in its restoration when lost. This is particularly true of a knowledge of the chemical nature and properties of the foods that we eat; for food determines in far greater degree than most of us suspect our state of health.

By the use of ill-chosen foods, children may be stunted in growth, deformed in body, deprived of the abounding physical energy which they should have and rendered unable to resist disease. In the same way, men and women may, as the result of the eating of wrong foods, lose their physical vigor and their ability to resist infectious diseases, become a prey to certain organic diseases caused by the breakdown of vital organs, or become prematurely aged. A very large part of the sickness, suffering and premature death that takes place among human beings may be traced to the use of ill-chosen foods; and likewise very much of the poor health that falls short of actual sickness, such as is seen on every hand, is due to the same cause. It is becoming quite clear that we may, through a knowledge of chemistry, learn how to eat to keep well and to live long.

REFERENCE:

Cooper, Barker & Mitchell: Nutrition in Health and Disease, chap. 1.

The Threefold Function of Our Food

The food that we eat serves three distinct purposes in our bodies.

(1) It furnishes materials out of which *new, living tissues* are made.

(2) It produces, by combining with oxygen in the blood, the *energy that is necessary* to keep us alive. One form in which this energy is released is heat; for by it our bodies are

kept warm. Another form, which we must also have observed, is muscular energy; and still other energy, of whose release in our bodies we are usually unaware, is expended by our vital organs in carrying on their appointed work.

(3) It *regulates certain of the vital processes* in ways that we are not in all cases able to understand.

REFERENCES:

Black and Conant: Practical Chemistry (Revised), p. 367.

Vivian: Everyday Chemistry, p. 324.

Dinsmore: Chemistry for Secondary Schools, p. 357.

Garard: Applied Chemistry, p. 217.

Foster: Romance of Chemistry, pp. 400, 403.

The Food That Becomes Living Tissues

For the first of the three functions named above, the manufacture of living tissues, our bodies must have a kind of foodstuff known as *protein*. It is found in most of the common foods, though the amount present is as a rule relatively small. Some foods that are notably rich in protein are milk, eggs, meat, beans and peas.

Pure protein always contains four elements with which we are already familiar; viz., carbon, hydrogen, oxygen and nitrogen. In addition to these elements, most proteins contain sulfur; and some of them contain phosphorus and iron. The living tissues made from them are likewise composed of the same elements. Thus we see that these seven elements, previously studied as things unrelated to any manner of life, actually compose, when combined in ways that nature alone knows, the substances in which life resides. What properties they have that makes them the sole abode of life is unknown. Yet we know that life exists nowhere, save in tissues consisting of the familiar elements which make up protein.

REFERENCES:

Foster: Elements of Chemistry, p. 280.

Vivian: Everyday Chemistry, pp. 282, 284, 292, 324, and 343.

Green and Bennett: Chemistry, pp. 652-659.

Dinsmore: Chemistry for Secondary Schools, p. 359.

Sherman: Chemistry of Foods and Nutrition, chap. 3.

Cooper, Barker & Mitchell: Nutrition in Health and Disease, chap. 8.

Foster: Romance of Chemistry, pp. 403-404.

Eddy: Nutrition, chap. 4.

The Foods That Give Us Heat and Strength

The second function of foods is to provide the energy expended by our muscles and vital organs and necessary to keep our bodies warm. If such energy were not generated within us, our hearts would very soon quit beating and life therefore cease. Thus its great importance to us is clear as is also the difference between this function of food and that of tissue building.

The energy needed by our bodies is not normally produced by proteins, but by two other classes of food substances: viz., *carbohydrates* and *fats*. Both of these consist of the same three elements, carbon, hydrogen and oxygen.

The most familiar forms of pure carbohydrates are starch and sugar. Many foods are composed largely of the one or the other. Thus foods made from grains, or cereals, such as bread, pastries and breakfast foods, contain a high percentage of starch, as do also certain vegetables, including potatoes, sweet potatoes and squashes. Sugar is, of course, abundant in all sweet fruits.

Fats may exist at ordinary temperatures in either the solid or liquid state. In the latter case, they are called oils. The most common fat in our foods is butter. However, meats contain such fats as lard and tallow; and foods derived from plants, whether cereals, fruits or vegetables, may contain fats or oils, in either large or small amounts. Indeed, some are so rich in oil that it is extracted and sold as a separate product. Examples are olives, peanuts, cocoanuts and even Indian corn.

When carbohydrates, which really comprise as a rule the major part of our diet, are eaten, the carbon that is in them combines in the muscles with oxygen from the lungs, forming carbon dioxide, CO_2, and *at the same time* generating the heat and the muscular or physical energy which the body needs. The process is very similar to the one taking place in a stove or furnace when coal, which is nearly pure carbon, is burned. It, too, combines with oxygen, forming carbon dioxide which escapes through the chimney, and producing heat; and if the coal is burned beneath a boiler, physical energy, which in the case of a steam engine turns the wheels and moves other machinery, is generated at the same time. We do not know why it is that when the elements carbon and oxygen combine to form the new compound, carbon dioxide, heat and physical energy are likewise

produced. Neither do we know why these two elements will combine at a relatively low temperature in our bodies, but will do so only at high temperatures in a furnace. Yet if either of these things were not true, we could not exist long. That nature has discovered and made use of these secrets in so strange a manner can hardly fail to excite our wonder and admiration. Moreover, we can see why chemists and others who have studied the process so often refer to the *burning* of the foods within the body.

The fats and oils are burned within us just as are the carbohydrates. However, when they are burned, *more heat and physical energy* are produced, pound for pound, than are generated by the burning of carbohydrates. The chief reason for this is that when they are burned *both* carbon and hydrogen combine with oxygen, instead of carbon only. In general, a given amount of fat produces about 2¼ times as much heat and physical energy when burned as does the same amount of carbohydrates.

It is not easy to know just how much of carbohydrates and fats we should eat in order to furnish our bodies with just the right amount of heat and physical energy.

Our bodies are apparently able to make certain adjustments if we eat either too little or too much of these foods. If one eats too little to yield the requisite amount of heat and physical energy, his body turns to the proteins in his food and burns them instead to make up the deficiency. If he eats too much of carbohydrates, it first converts them into fats and then stores them away in the tissues; and if he eats too much of fats and oils, they are stored in similar manner. In this way *only* do people become "fat"; and in order to "reduce" it is only necessary to eat a little less of carbohydrates and fats than they need, in which case their bodies will proceed to burn the fat that is stored away in their tissues.

REFERENCES:

Black and Conant: Practical Chemistry, p. 357.

Foster: Elements of Chemistry, pp. 350, 352, 374.

Vivian: Everyday Chemistry, pp. 274, 276, 293, 325, and 343.

Dinsmore: Chemistry for Secondary Schools, p. 358.

Sherman: Chemistry of Foods and Nutrition, p. 5 and chap. 1.

Cooper, Barker & Mitchell: Nutrition in Health and Disease, chap. 6.

Foster: Romance of Chemistry, pp. 404-407.

Eddy: Nutrition, chap. 5.

The Foods That Regulate Our Vital Processes

The regulating of vital processes comes to have its fullest meaning only when we have studied thoughtfully the quiet changes, ordinarily hidden from our eyes, that are more or less constantly going on within our bodies. They include the processes of growth, of resistance to disease, of healing, of digestion, and many others as important, which, like these, might be easily overlooked, yet which are essential to life and health.

There are two classes of food substances whose function is to regulate these vital processes. They are *minerals* and *vitamins*.

Minerals are present in nearly all foods. This may be shown by burning them in a fire, when ashes are found just as in the case of ordinary fuel. Thus it is not necessary to eat our minerals in a pure form, save in the case of common salt, Na Cl. However, some mineral elements are more important than others since our bodies need more of them; and foods differ as to the kinds and amounts of minerals present. In particular, we need *calcium, phosphorus, iron* and a slight amount of *iodine*. Table I on page 15 shows which of the common foods are richest in each of these elements. In general, the best sources of minerals are milk, fruits and vegetables. After these would come eggs and meats; and the cereals rank lowest with respect to the minerals which they contain.

In still another way, our health seems to be influenced by the minerals in our food. When the food containing them is burned in our bodies, these minerals, which correspond to the ashes left when fuel is burned, are thrown into the blood. The minerals from some foods are *acid* in character while those from others are *basic*. Whether our blood is acid or basic in its reaction seems to depend upon which kind of minerals predominates in our food. Yet good health in turn appears to require that the blood *be kept neutral or very slightly basic*. It follows then that we should select our foods so that those yielding basic minerals, or ash, will be sufficient in amount to neutralize the acid minerals left in the blood by others.

Table II on page 15 gives the character and relative amounts of ash produced in the blood

by each of the most common foods. It shows, in general, that the foods producing most basic ash are milk, cheese, fruits and vegetables, while those producing most acid ash are eggs, meat and food prepared from grains, as bread and pastries.

REFERENCES:

Green & Bennett: Chemistry, pp. 344-349.
Sherman: Chemistry of Foods and Nutrition, chaps. 9, 10, 11 and 12.
Smith & Mess: Foundations of Modern Chemistry, pp. 131-135.
Cooper, Barker and Mitchell: Nutrition in Health and Disease, pp. 34-38. chap. 4.
Eddy: Nutrition, chap. 6, p. 88.

The Vitamins as Regulators of Vital Processes

In addition to proteins, carbohydrates, fats and minerals, which we have already studied, foods contain still other substances, long unsuspected and only recently discovered, known as vitamines. They have not yet been separated from the foods and prepared in pure form. They are known to be present only in exceedingly small amounts; but notwithstanding this, we must have them if we wish to maintain our health. Some of the most horrible diseases known to humanity, as pellagra, beri-beri and scurvy, have been found to be caused solely by the absence of certain vitamins from the diet. Aside from this, however, they make possible growth, the deposit of mineral matter in the bones, reproduction, resistance to infectious diseases and certain other results which are essential to our life and happiness.

In general, a diet to provide the vitamins necessary for health should contain fresh vegetables and fruits, milk, butter, some meats, including liver, and whole cereals. Even if these are present in the usual amounts, there may still be a deficiency as to the vitamin referred to as D unless one spends considerable time out of doors in the sun. One of the strangest of all newly-discovered truths is that when the sun's rays fall upon our skin they cause the formation of this vitamin within our bodies. Yet the particular rays that bring about the formation of this vitamin can not pass through glass. It follows that we can not take our sunshine through a window while indoors, but must go outside instead. If this is not practicable, we can secure vitamin D by taking cod liver oil, which contains a relatively large amount of it.

REFERENCES:

Black and Conant: Practical Chemistry (Revised), pp. 371-372.
Foster: Elements of Chemistry, p. 375.
Vivian: Everyday Chemistry, p. 343.
Green & Bennett: Chemistry, pp. 666-668.
Dinsmore: Chemistry for Secondary Schools, p. 360.
Garard: Applied Chemistry, pp. 226-230.
Sherman: Chemistry of Foods and Nutrition, chaps. 14, 15, 16, 17, and 18.
Smith & Mess: Foundations of Modern Chemistry, pp. 135-140.
Cooper, Barker & Mitchell: Nutrition in Health and Disease, chap. 5.
Foster: Romance of Chemistry, pp. 412-419.
Stieglitz et al: Chemistry in Medicine, chaps. 4 and 10.

How We Should Select Our Foods

We can see from the foregoing how important it is that we eat the right foods rather than merely those we like. In general, our likes and dislikes are false guides. If we follow them, we may expect to miss the full measure of physical health and vigor that are essential to our greatest happiness; to lower our resistance to infectious diseases; to find our vital organs weakening and breaking down before they should; and finally to grow old prematurely. It follows that one of the most valuable accomplishments that we may possess is the complete mastery of our palates.

The necessary amount of *proteins* is easily obtained from the usual diet. In fact, some investigators think that care has to be taken not to overeat of protein foods. However, this has not been definitely proved. Table I on page 15 shows the percentage of protein in each of the more common foods. By referring to it, we may determine which are the high protein foods from which our choice may be made.

We obtain our *minerals* and *vitamins* primarily from vegetables, fruits and milk. From green leafy vegetables we get iron, a mineral essential for the forming of red blood. Calcium is needed for the growth and repair of bones and teeth. It is found in milk. A quart of milk a day for each child, even of high school age, and a pint daily for adults is none too much. Phosphorus, the third mineral

we especially plan for, is supplied by meat and whole grain cereals.

Vitamin A, the first one to be considered, is found in milk and butter; in tomatoes, carrots, and other yellow and green vegetables; vitamin B in green vegetables, milk and whole wheat. We get vitamin C from oranges, grapefruit, tomatoes and cabbage. An abundance of outdoor sunshine activates vitamin D.

The *carbohydrates* are often used thoughtlessly. They satisfy the appetite, giving one a feeling of fullness; and so he is not hungry for the food essential for regulating and building the body. *Fat* is used most efficiently when some carbohydrate is present. One ounce of fat requires about four ounces of carbohydrates for complete oxidation.

A fairly good plan whereby one may learn whether he is eating about the right amount of carbohydrates and fats is to compare his weight with that of a normal person of his age and height as shown in Table III on page 16. If it varies greatly from that given in the table, he should, in general, increase or decrease the amount of carbohydrates and fats eaten according to the necessities of the case. And if he will take a liberal supply of fresh fruits, vegetables and milk in the diet, together with plenty of sunshine, his needs with respect to minerals and vitamins will be reasonably well met.

REFERENCES:

Foster: Elements of Chemistry, p. 376.
Vivian: Everyday Chemistry, pp. 343-348.
Green & Bennett: Chemistry, pp. 665-666.
Dinsmore: Chemistry for Secondary Schools, p. 362.
Garard: Applied Chemistry, p. 217.
Rose: Foundations of Nutrition, p. 300, 306.
Sherman: Chemistry of Foods and Nutrition, chap. 20.
Harris: Everyday Foods, chaps. 2, 3, 10, 23.

The Danger From Food Poisoning

Foods that to the eye and palate seem perfectly wholesome sometimes prove to be highly poisonous instead. Many deaths have resulted from the use of such foods by mistake. Formerly the poisonous effects were thought to be due to certain chemical substances known as ptomaines, which are formed when proteins decay. This belief is no longer held; yet the question of just why good food should become poisonous has not been satisfactorily answered.

It is known that only in foods containing proteins, usually in considerable amounts, may the unknown poisonous substances be formed. Thus most, but not all, cases of food poisoning may be traced to meat, fish, milk, cheese, etc. These foods may be either fresh or canned. In many cases, some early signs of decay are noted either in the appearance or the odor of the food, yet this is by no means always true. Frequently, the poisonous foods have not been recently cooked; but again, some cases of poisoning have been traced to foods consumed while still hot from a thorough cooking.

The best explanation seems to be that certain bacteria, which get into food and multiply there, produce substances that are tasteless, yet violently poisonous when taken into our digestive tracts. Since some cases of meat poisoning have been traced to animals apparently ill when slaughtered, it is thought that in these cases the bacteria may have got into the muscular tissues of the animals while still alive. In many cases, however, it is certain that the bacteria have entered the meat later; and they could, of course, get into other foods in the same manner. Furthermore, it appears that while the poisons produced in the foods by some kinds of bacteria are destroyed by cooking, those from other bacteria cannot be destroyed in this way.

Since poisons may actually be present in dangerous amounts before any change in appearance, odor or taste can be detected, great pains should be taken in the selection and care of all foods derived from animals. If such foods are kept in a refrigerator, bacteria can not propagate in them; but they can do so if the foods are kept at ordinary temperatures. It follows that we should avoid purchasing foods that are kept in the latter manner and also that after purchase, they should, if possible, be kept at temperatures low enough to prevent the growth and propagation of bacteria. Aside from this, all meat and fish foods should be thoroughly cooked before they are used. Even after cooking, they should not be set away long in cupboards at room temperatures; and if any suspicious change is noted in their appearance, odor or flavor, they should be discarded. If in addition to the above we avoid eating in public places where such foods appear to be carelessly handled, we shall probably be taking about all the precautions that are possible to avoid the very real dangers that

lurk in carelessly kept foods, especially of animal origin.

REFERENCES:

Encyclopedia Brittannica, Fourteenth Edition (1929), vol. 9, p. 456.

Savage: Food Poisoning, pp. 8-110.

Poisons Produced by Micro-organisms

Of poisons, which are substances that can injure health or destroy life, there are many kinds. Among them are certain gases, such as those used in war; liquids, as wood alcohol, carbolic acid or the venoms of serpents; and many solids, including arsenic, strychnine, morphine and the like. Yet there can be little doubt that the poisons of which we are in greatest and most constant danger are none of the above, but those actually manufactured *within our own bodies* by disease-producing micro-organisms.

Contagious diseases generally, and also many others, are caused by microscopic organisms which have found their way into the body and are propagating, or multiplying, there. Yet it is apparently not their mere presence in our bodies that causes the illnesses from which we suffer, but rather the poisonous substances, known as *toxins*, that are manufactured by them.

These toxins differ in their effects upon our health. The effects of any given toxin seems to depend upon the kind of micro-organism that produced it. Thus that form of organism that causes lockjaw, or tetanus, brings about a contraction of the muscles not only of the jaws, but of the other parts of the body, occassionally in the later stages doubling the victim up forward, backward or sideways. On the other hand, the toxin produced by the micro-organism causing diptheria may seem to have no serious general effects upon the system, other than a moderate fever and weakened pulse, until there is a swift, sudden collapse, frequently resulting in death.

When we consider how many diseases are caused by micro-organisms which manufacture dangerous toxins within us against our wills the great importance of becoming able to avoid or resist the attacks of these microscopic creatures becomes apparent.

Perhaps the most valuable rule that we can follow is to maintain at all times the best possible state of health. The serum of the blood is an effective destroyer of certain bacteria; the blood, furthermore, contains substances which prevent micro-organisms from digesting the food substances about them; and finally the white corpuscles of the blood are known to devour and digest still others. In view of these facts, it is clear that ill-health may be expected to reduce our resistance to the attacks of disease germs. The observance of all laws of health, whether those relating to eating, to exercise, to sleep, or whatnot is an important means of avoiding the ever-present danger of falling victim to infectious diseases.

A second means of decreasing this danger is to avoid situations in which the micro-organisms of disease may be received from others. Such situations are quite numerous; and if one cultivates the habit of watching for them, he will find it possible to reduce materially the hazard of contracting infectious diseases. Of course, too, he should be as careful to protect others from such danger in case he, himself, should be suffering from any sickness that may be communicated to them.

Aside from depending upon (1) our natural powers of resistance and (2) care in avoiding the dangers of infection, we can often, by prompt and intelligent action, minimize the risk of serious consequences in case we find that danger actually exists despite our precautions. Infectious diseases generally are much more effectively treated in their early stages than later. It follows that a physician should be called early in case of any unusual illness; and fresh wounds or breaks in the skin, however trivial, should be most carefully cleansed and given proper antiseptic treatment.

REFERENCES:

Encyclopedia Brittannica, Fourteenth Edition (1929), vol. 2, pp. 895-896.

Foster: Romance of Chemistry, pp. 427-429.

Stieglitz et al: Chemistry in Medicine, pp. 543-558.

The Use of Antiseptics, Serums and Vaccines

The fact that infectious diseases are really caused by micro-organisms has been known but a comparatively short time. When it was once established, a general search began for substances that would prevent the growth and propagation of bacteria in the human body. Such substances, of which a large number have been found, are called *antiseptics*. Some actually destroy the micro-organisms, while others merely prevent their propagation. The former group are known as *germicides*, or *disinfectants*.

Among the disinfectants first discovered was carbolic acid, or phenol. It consists only of carbon, hydrogen and oxygen, its formula being C_6H^5OH. Notwithstanding these are the same elements that we have found in carbohydrates and in fats, which are highly important foodstuffs, it is still a violent poison. In weak solutions, it is an effective germicide and has been commonly used for the disinfection of wounds. It has proved unsafe, however, because it sometimes produces gangrene or death of the flesh to which it is applied.

This is rather typical of our experiences with antiseptics to date. Most of the substances that will destroy micro-organisms will also destroy the cells of which our bodies are composed. For this reason, disinfectants are not much used by surgeons, who endeavor instead to prevent any germs from entering the wounds produced by their instruments.

In actual life, however, many wounds occur which are infected from the beginning. That is, the micro-organisms are introduced at the time the injury is received. Whether it is due to the prick of a pin, the scratch of a briar, the bite of an animal or any other cause, there is always a very real danger that this may have happened. Indeed, very many fatal cases of blood poison and lockjaw have resulted from wounds so slight as to escape attention until the infection was beyond human control. Neither can one be sure that the germs in any given case have been removed, however carefully the wound may have been cleansed.

Perhaps the most commonly used of really safe and effective household disinfectants is tincture of iodine, diluted with alcohol to about half strength. It is painted thinly over the torn surfaces and should go as far into the wound as the germs may have been carried. It should not be used near the eyes, since it irritates them seriously. Like most other antiseptics, it is poisonous if taken internally and should be kept away from children.

Another antiseptic which has only recently been discovered but which promises to come into general use is *mercurochrome*. It contains the same three elements as carbolic acid, C, H and O, with the addition of mercury and bromine. While it is apparently highly effective in destroying micro-organisms, it is not poisonous, does not irritate or burn the tissues, and penetrates them more deeply than does iodine. It is not injurious to the eyes. While iodine stains the skin brown, mercurochrome stains it a bright red.

The element *chlorine* is a powerful germicide. While it can not be readily used under home conditions, a large majority of American cities make use of it to destroy micro-organisms in their water supply, an exceedingly small amount having been found sufficient for this purpose.

It is apparently true that the most effective antiseptics known are not artificially prepared chemical substances like those named above, but complex organic substances instead, which are produced in the blood of human beings or in that of other animals. These substances are generally known as anti-toxins, since they destroy toxins produced by micro-organisms. While we can not make them in the laboratory, we can in many cases cause them to be formed in the blood of certain animals by injecting the disease germs into them. After sufficient time has been allowed in a given case for the anti-toxin to be formed, some of the animal's blood is drawn off and the serum, or liquid portion is separated from the other parts This serum contains the anti-toxin; and if some of it is now injected into a person suffering from the disease produced by the germs injected into the animal, it will in many cases effect a cure. Thus the death rate from diphtheria, which a generation ago was 33%, has been reduced to zero, provided anti-toxin is given at the beginning. In a similar manner, the mortality from tetanus has been greatly diminished.

There are two interesting variations of this general plan of securing from lower animals substances with true antiseptic properties which we can not produce ourselves.

One is the use of substances known as vaccines. In preparing these, too, the disease germs themselves are used. They are usually propagated under artificial conditions, thus producing a toxin without the corresponding anti-toxin. This toxin, but not usually the germs, is then injected into the human patient. At first the amount is small, but it is gradually increased; and as a result the patient's own body is stimulated to manufacture the necessary anti-toxin on its own account. By this process he is made immune to the disease. It is in this manner that typhoid fever has been virtually conquered and a number of other diseases brought partially or wholly under control.

The other variation of the method used in the serum treatment of disease is seen in the preparation of serums to counteract serpent venoms. It has been found that if the venom of any serpent, which is, of course, a toxin, is injected in gradually increasing amounts into a horse, the latter will begin to manufacture an anti-toxin for it. Finally, the horse will become immune to the venom; and if the serum from its blood is injected into the veins of a person who has been bitten by the same serpent, it will usually give quick relief. Indeed, this is the only reliable method known for curing patients who have been bitten by certain highly venomous snakes.

The manner in which nature piles mystery upon mystery before the eyes of students of chemistry is nowhere more clearly seen than here. In our study of foods we found that the living tissues of our bodies are made from substances called proteins, which consist only of the seven elements, C, H, O, N, S, P and Fe. It is quite certain that the many toxins produced by micro-organisms are likewise proteins as are also the anti-toxins formed in the bodies of animals and the venoms of serpents, which we have just studied. Just how these seven elements, all of which are essential to life, can be combined in so many different ways, producing sometimes substances destructive to life, and at others, substances that tend as actively to preserve it, surpasses human understanding. Yet we know that the actual number of protein substances produced in nature, whether by animals or plants, is vastly greater than has been indicated here, and that very many, if not indeed most of them seem to sustain some such close, inexplicable relationship to the phenomena of life as do the ones that have been met in the preceding pages.

REFERENCES:

Foster: Elements of Chemistry, p. 403.
Vivian: Everyday Chemistry, pp. 254 and 389.
Green & Bennett: Chemistry, p. 523.
Encyclopedia Brittannica, Fourteenth Edition (1929), vol. 2, p. 78, vol. 20, p. 373, vol. 22, p. 923.
Sadtler: Chemistry of Familiar Things, pp. 255-258.
Garard: Applied Chemistry, pp. 159-165.
Dull: High School Chemistry, p. 547.
Bartlett and Ink: Principles of Chemistry and Their Application, chap. 26, pp. 176-180.
Stieglitz et al: Chemistry in Medicine, pp. 543-603.

Other Poisons That Should Be Avoided

In addition to the sinister and treacherous poisons which may be found in our own blood without our knowledge or desire, there are many others that are hardly less dangerous, yet much more easily shunned.

Among these is the odorless, invisible gas, *carbon monoxide,* CO. It is produced when carbon is burned with too little air to furnish the necessary amount of oxygen. As we know, if sufficient oxygen is present, carbon dioxide, CO_2, is formed instead.

Carbon monoxide is found among the exhaust gases from any automobile. If the motor is run for even a short time in any ordinary home garage when closed, this gas accumulates. Its presence can not be detected until too late, for its victim usually falls unconscious without warning and death often ensues quickly. A similar danger exists in bath rooms having gas heaters for the water. The carbon that enters into the CO comes in the one case above from the gasoline burned in the motor; in the other, from the fuel gas. The peculiar, deadly character of carbon monoxide is due to the fact that it combines chemically with the coloring matter of the red corpuscles, or haemoglobin, which carries oxygen from the lungs to the capillaries and carbon dioxide back to the lungs again. It follows that breathing can no longer accomplish its purpose after the haemoglobin is destroyed; and the effect is the same as if it should cease from any other cause.

Wood alcohol, CH_3OH, more properly called methyl alcohol, is another poisonous substance which should be used very carefully, if at all. If taken into the stomach, or even if absorbed through the skin, it frequently causes permanent blindness. In considerable amounts, it produces death. It is often used in the manufacture of unlawful alcoholic liquors.

Ethyl alcohol, C_2H^5OH, which is the kind found in intoxicating beverages, acts, if taken in large amounts, as a violent poison. Its habitual use in somewhat smaller amounts, leads to a disease known as cirrhosis of the liver, which commonly proves fatal; to other serious maladies, as chronic indigestion, which deprives the body of food, and insanity; to dimin-

ished resistance to surgical operations and disease; and to an apparent weakening of the will and moral fiber.

Very many *mushrooms* are poisonous, yet resemble those used for food so closely as to make it exceedingly difficult to distinguish them when gathered. In view of the numerous unintentional but fatal mistakes that are made, it should probably be accepted as an inviolable rule that only persons who are thoroughly familiar with the multitude of varieties of these curious plants should gather them for table use.

In the home medicine cabinet, or even on open shelves, are often kept remedies that are highly poisonous. They should, instead, be safely locked up where children can not reach them and older persons can not take them or administer them to others by mistake.

Many proprietary, or so-called *"patent" medicines* likewise contain drugs that act as slow poisons if used even irregularly over a long period of time. Indeed, it is unquestionably true that drugs of practically all kinds are harmful if taken frequently enough. Good health is not attained through the "patent medicine" habit, but through the observance of the known laws of health. Medicines should be used only when we are sick; and then they should be taken only under the direction of a physician. The habitual, or even frequent use of proprietary medicines is a practice from which much evil and little if any good will come.

REFERENCES:

Green & Bennett: Chemistry, pp. 424-427, p. 515.

Encyclopedia Brittannica, Fourteenth Edition ((1929), vol. 1, p. 541.

Sadtler: Chemistry of Familiar Things, p. 259.

Dinsmore: Chemistry for Secondary Schools.

Dull: High School Chemistry, pp. 320-323, pp. 407, 542, 548-550.

Smith & Mess: Foundations of Modern Chemistry, pp. 302-303.

Holmes & Mattern: Elements of Chemistry, pp. 265-268.

Bartlett & Ink: Principles of Chemistry and Their Application, pp. 154-155, pp. 230-232.

In addition to the above material, tables to which the pupils would find it necessary to refer, occupied the last pages of the booklet.

No specific directions were given to teachers as to how the unit should be presented. Instead, it was felt that to demand that instructors forsake their accustomed methods and adopt one prescribed for them would be to introduce a factor into the experiment which might easily lead to unsatisfactory results. However, a copy of the little "Booklet of Teaching Skills," which contained in condensed form a definite statement of each of fifteen techniques regarded as essential in problem teaching, and which had been prepared for the use of classes in methods at Iowa State College, was sent with the booklets. Moreover, the letter which accompanied the material contained a recommendation that the techniques in question be used as far as the instructor felt inclined and able to do so.

As was stated above, the number of teachers of chemistry in North Central Association high schools who participated in the experiment was twenty. In general, if we may judge by the statements which they made after the study was completed, they found the unit satisfactory. In an abridged form, these statements are quoted below. Each one is taken from a different letter. In one case, the experiment was postponed until the current year and no report has yet been received. The names of the writers are not given.

"My classes finished the study of the Health Unit in Chemistry late in May. We were very much pleased with the unit. Had we had more time (we used seven or eight days) and more reference books we could have gained much more than we did, although the students and I felt that it was very much worth while . . . . . I am saving the pamphlets and expect to use them again next year."

"(1) In my judgment, you have selected the most vitally valuable subject in the entire field of education as an experiment in study. (2) Every student who studied the booklet told me that it was one of the most va'uable studies in high school. Each one asked the privilege of keeping the booklet, and I took the liberty of granting their request. The students enjoyed the reference method of

study and mentioned that aspect of the experiment specifically. They praised both the method and the content of the experiment, and they appreciated the liberty it gives them in arranging their own time for study. (3) As to "teachability," I am very much in favor of the very practice you employ therein. If I had the money, I would arrange the whole High School course on that basis. (4) Concerning "faults," I believe it is scarcely fair to think of them in the beginning, so well made, of a work that is so vitally needed. You have stated the importance of selecting food, in language so clear and convincing that I don't like to make even a suggestion of change. When you publish the next edition, perhaps the outline form could be emphasized slightly more, although not too much."

"Although a second semester class would have been better equipped for its study, the unit was well received in my first semester class. It aroused quite a little interest in class discussion and I am sure would have aroused more interest if we had had time for the use of references . . . . . I am convinced that "The Relation of Chemistry to Human Health" should be emphasized by every high school chemistry teacher. I believe, though, that best results could be obtained by applying that emphasis at every opportunity throughout the course with some such unit as you have prepared being used as a summary at the end of first year chemistry course. I hope that the investigation you are conducting will influence text book writers to the extent of getting them to adopt the emphasis of the relation of chemistry to human health as one of the important objectives of the chemistry course."

"My students were enthusiastic with the pamphlet entitled, "The Relation of Chemistry to Human Health." The following are the outstanding things which appealed to all students. (1) The fact that there are so many compounds manufactured in the body. (2) The importance of proper eating compared with wet feet, etc. (3) The fact that a knowledge of chemistry is as helpful in the maintenance of health as in the curing of disease. (4) The importance of proper selection of food and its influence on our health. (5) The proper selection of a balanced menu. (I think this was an eye opener especially for boys). (6) The relatively small number of elements which compose the living tissue. (7) The relation of weight between the energy derived from fats and that from carbohydrates. (8) The fact that carbon from the carbohydrates and fats combines with the oxygen from the lungs in the muscles to form carbon dioxide heat and energy. (9) The three-fold function of food. (10) How they may properly "reduce." (11) The ability of the body to make adjustments regarding the food we eat. (12) Fact that carbon and oxygen combine in the laboratory at a relatively higher temperature than within the body. (13) The minerals we need and the effect in regulating the vital processes. (14) The different vitamins, where found and influence of each. (15) Poisons of various sorts. (16) Ways of maintaining health, especially diet and avoiding dangers of infections. (17) A medicine chest for the home. (18) (Most impressive of all) the fact that the seven elements build our bodies may form toxins and anti-toxins as well . . . . . I wish to compliment you on this outline for the study of Chemistry and Health. I could write you many expressions from students regarding this unit of our work . . . . . I happened to have worked in the biological laboratory of Parke Davis and Company in Detroit. My job was the growing of diptheria germs and the making of toxin. We had a fine time on that part of the pamphlet. I wanted to devote more time to patent medicines than we did but our time was short."

"As one of the teachers who tried out the unit on health as part of the high school chemistry course I would like to state that it was a very successful part of our work. Pupils liked it; especially, or so it seemed, did it appeal to the boys. As a whole the class was disappointed at not having longer than a week's time to devote to the study. That was all that we could spare, however, without planning further in advance than we did at the beginning of the semester. As a part of the final examination pupils were asked to tell what they liked best about the course, what they would have preferred eliminated and what they would have liked in greater detail. It was interesting to note that the larger proportion of the class expressed a preference for more work on health, especially foods in their relation to

body needs. Some of my very brightest boys said they were quite disappointed in not learning more about foods. A large number mentioned the unit as being usable in every day life. The teaching helps were well thought out and valuable. I am saving all of the pamphlets to use again next year. Thank you for allowing us to cooperate in the trial of the material."

"*Good Points:* (1) Interesting in practical applications. (2) Brings out acid basic relationship in the blood. (3) Proper length if used as source material. *Criticisms:* (1) Too long if the student does very much outside reading. (2) Bibliography not complete enough. (3) Uses disinfectant and antiseptic inter-changeably. (4) Not enough chemistry given . . . . . It is a good bulletin."

"You wished a report on the presentation of your teaching unit. "The Relation of Chemistry to Human Health." In the first place, it was received enthusiastically. Requests from students of my other classes for the same presentation lead me to believe that it fills a need of which the students themselves are aware, and that consequently their interest is natural and not assumed. Members of the class taking the work said it had brought to them information of positive benefit."

"As teacher of chemistry I took several days to present the unit, and believe it was worth-while. Although I made no inquiries I believe that the pupils found it as interesting as the chemistry text-book and probably of more value. From my own standpoint I would favor such a unit—and even more thorough-going—in every high school chemistry course."

"Some of the pupils were inclined to consider the material slightly foreign to the course. To me their criticism gave this idea: rather than isolate the material it should be included in the regular text book work as it fits in. Later a symposium of such work could be made by the pupil just as some of us do on other materials such as commercial processes, applications to the household, to cleaning, etc. The material on the whole offers a valuable contribution and stimulates research into food uses and also interest."

"I received the booklets in plenty of time and used them in one section of Chemistry II. The class took a keen interest in the unit and I feel sure it opened up to them a field of applied chemistry which they had not as yet realized. Personally I consider the unit a fine one and very teachable."

"We devoted about a week to the unit in addition to the previous study in the text. I found the problems which you sent with the pamphlets very helpful in presenting the material. The students enjoyed them and entered into some interesting discussions. We also prepared menus for balanced meals. We had also run some experiments on foods which were helpful. We had very few of the reference books in our library so we had to rely on the pamphlets and our texts. I am firmly convinced that such material should be included in every general chemistry course. The material on the composition of foods is found there more often, I believe, than that on poisons which is just as important."

"The booklet, the Relation of Chemistry to Health, was received, and the project carried out according to your suggestions. My impressions of the unit are as follows: (1) The unit is practical. (2) I noticed an increase of 50% in class activity. (3) The unit is very "interesting." (4) Helpful. (5) The unit emphasizes important facts learned in General Science and Health. (6) Shows applications of chemistry to every-day activities,—"Health." (7)The unit is "well-written"—can be easily understood by the average pupil. (8) The unit can easily take the place of the average chapter on "Foods," found in a text. Inclosed, I am sending you some "pupil expressions" upon this very interesting unit."

"My pupils like to study the unit. They considered it to be of permanent value to them . . . . . We were handicapped in that we have few reference books in our library. We did the best we could. Many of the members of the class by consulting the Readers Index at the Public Library found articles in recent magazines to help solve the problems . . . . . I hope that you will send me other units of the series to teach in my class the coming year. I feel that this letter is of little value to you. I am sure that I ought not criticize the unit adversely, my pupils liked it and the measured results showed that they were able to do sound thinking on the problems."

"I presented the subject "The Relation of

Chemistry to Human Health" to two classes. The subject was received very well by both groups. One was a class of boys the other a class of girls. From the general interest and type of questions asked the students seemed interested in the subject and to enjoy it. As for myself I enjoyed presenting the matter. I believe the subject is decidedly worth-while and that it would be well worth including in our present type of high school text book. I believe that if this subject is introduced in our text books it should follow organic chemistry which is generally presented near the end of the text. Possibly it would be a good thing to enlarge the scope and give more detail in presenting this subject and omit the related topics in other chapters . . . . . I believe it would be profitable and interesting if the subject of vitamins was given more attention."

"I like the idea myself and feel it is of utmost value in motivating the study of a most practical unit of knowledge. I would suggest that it be used more as a vehicle to give a better knowledge of carbon chemistry. Would suggest an amplification to take up in an elementary way the structure of fats, carbohydrates and a few proteins . . . . . I do not believe a more thorough treatment of the oxidation of fats, the function of insolin, the end products of metabolism, etc., would detract from its teachability . . . . . I considered it a fortunate circumstance that I had a chance to study this excellent endeavor to vitalize a subject which is too often taught in a rather detached and aloof manner. If you have other units I would be delighted to see them and would try some of them out in my classes next fall."

"We think the unit on "The Relation of Chemistry to Human Health" was well worth the time devoted to it in our chemistry classes. We tried it in four classes, allowing one week for each class. It illustrates the practical applications of chemistry in daily life, and helps the pupils to realize this value of the science. The attitude of the pupils was desirable in our experiments with the unit. It is quite teachable. I noted a tendency among pupils to get the false idea that one particular factor of diet principles was the predominating one . . . . . I suggest that such a unit be organized in a way to outline clearly all the outstanding principles of diet selection. I think also that each principle should be weighed with relation to the other principles."

"We were very much pleased with the results obtained from the use of your unit on "The Relation of Chemistry to Human Health." The results were good and I feel sure that it added interest to the subject. The pupils in general showed a lively interest and enjoyed the work more than the usual assignments on other subjects. I hope that we may be able to have this in our work again the coming year."

"I not only believe the course treats a very important phase of chemistry, but I believe the course is well selected as to material, so far as it goes. I believe, however, that the course might profitably be extended so as to cover three or four weeks' work, for I believe that in its relation to health is the field where chemistry finds most universal and practical application. I believe that much of the industrial application of chemistry could profitably be displaced by this course. May I be privileged to make a couple of suggestions as to the material that, in my judgment, might profitably go into an extension of this course. I believe a more extended, and therefore more detailed and specific discussion of the various mineral salts used by the human system the specific function they serve, and the effects of deficiencies would be very profitable. This could then be followed by a discussion of the mineral salts found in our various foods, together with a discussion of the effects of the different methods of cooking foods on the retention of these mineral salts. Some tables and a set of specific exercises on this material would drive the facts connected with this home with the student."

"The study unit, the Relation of Chemistry to Human Health, was favorably received by my class and elicited abundant response . . . . . Earlier in the year we had taken up the study of foods with particular reference to carbohydrates, fats, proteins and the vitamin accessories. I believe it would have been a great aid to the class to have had your study unit at that time. The material on toxins, antitoxins, serums and vaccines was something in addition to what we have regularly taken up. I believe the unit is easily taught and would be very valuable when presented

at the more appropriate time in the course."

In view of the rather crude and unsatisfactory form in which the unit was prepared, of the fact that the project was undertaken upon such short notice that teachers were unable to make any kind of preparation for it or to correlate it properly with other parts of their respective chemistry courses, and of the further fact that the trial of the unit was in most cases made in the last month of the school year when conditions are obviously unfavorable for experiments of this kind, there is apparently reason for encouragement that the opinions of the co-operating teachers were so generally favorable. This result seems to attest rather strongly the soundness and validity of the standards for the reorganization of high school curricula established by the committee under whose auspices the experiment was conducted.

A Qualitative and Quantitative Unit in Lyric Poetry[1]

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This unit is presented in response to request made by the Sub-committee on English of the Curriculum Commission of the North Central Association of Colleges and Secondary Schools. The primary purpose is to prepare, for experiment in an eleventh or twelfth grade class, a unit which shall be *qualitative* in the sense that the literary content shall be of high order, and be *quantitative* in the sense that fairly definite materials and experiences shall be distributed throughout a specified amount of time. In addition, the unit is designed to be in keeping with modern conceptions of teaching literature. The objectives are: (1) To acquaint the pupils with a body of standard lyric poetry (useful information); (2) to acquaint them with representative current poetry of the same order (information that functions in daily life); (3) to develop in the pupils an appreciation of the nature and functions of lyric poetry as compared with other types of literature (knowledge that functions in the discovery of abilities); (4) to develop in the pupils the skill and habits which are necessary for the interpretation of such literature (useful habits and skills); (5) to help establish a liking for and an appreciation of such literary experiences (attitudes, ideals, appreciations). In order to accomplish such objectives, the following plans embody a curriculum of numerous and varying pupil activities, and provide an abundance of individual and group projects which supplement the usual recitation method with socialized procedures.

No one textbook is selected as a core book, although Untermeyer, *Modern American and British Poetry* (Harcourt), more generally than any other one anthology, represents such core materials. In addition, the following volumes ought to be easily available for the class, preferably in the classroom or in an easily accessible school library:

1. Rich, *A Study of the Types of Literature* (Century)
2. Sperlin, *Studies in English World Literature* (Century)
3. Hanes and McCoy, *Readings in Contemporary Literature* (Macmillan)
4. Wilkinson, *New Voices* (Macmillan)
5. Brown, *Poetry of Our Times* (Scott, Foresman)

Such core books ought to be supplemented for the most fruitful experimentation by these volumes of literature:

1. Rich, *Classified Types of Literature* (Century)
2. Rittenhouse, *Little Book of Modern Verse* (Houghton Mifflin)
3. Rittenhouse, *Second Book of Modern Verse* (Houghton Mifflin)
4. Rittenhouse, *Third Book of Modern Verse* (Houghton Mifflin)
5. Carman, *The Oxford Book of American Verse* (Oxford University Press)
6. Drinkwater, Canby and Benet, *Twentieth Century Poetry* (Houghton Mifflin)

[1]This study has been made under the direction of the Committee on Standards for Use in the Reorganization of Secondary School Curricula, a sub-committee of the Commission on Unit Courses and Curricula. See page 442 for price of reprints on English material.—The Editor.

Readings in Lyric Poetry for Class Library

Brooks, Tucker—*The Shakespeare Songs*
Cullen, Countee—*Color*
De la Mare, Walter—*Peacock Pie*
Dickinson, Emily—*Complete Poems of Emily Dickinson*
Dunbar, P. L.—*Lyrics of a Lowly Life*
Forbes, Anita—*Modern Verse*
Frost, Robert—*Mountain Interval*
New Hampshire
North of Boston
Gibson, Wilfrid W.—*Collected Poems*
Housman, A. E.—*A Shropshire Lad*
Kipling, Rudyard—*Collected Verse*
Lindsay, Vachel—*Chinese Nightingale*
The Congo and Other Poems
Every Soul Is a Circus
Masefield, John—*Salt Water Ballads and Poems*
Masters, Edgar L.—*Spoon River Anthology*
Millay, Edna St. V.—*Figs from Thistles*
The Harpweaver and Other Poems
Monroe and Henderson, A. E.—*The New Poetry*
Moody, William V.—*Poems and Plays*
Morley, Christopher—*Songs for a Little House*
Newcomer, Andrews and Hall—*Twelve Centuries of English Poetry and Prose*
Noyes, Alfred—*Collected Poems*
Palgrave—*Golden Treasury*
Page—*Chief American Poets*
Rittenhouse, Jessie B.—*Little Book of American Poets*
Robinson, Edwin A.—*Collected Poems*
Sonnets
Sandburg, Carl—*Chicago Poems*
Smoke and Steel
Sarett, Lew—*Slow Smoke*
Service, Robert W.—*Rhymes of a Red Cross Man*
The Spell of the Yukon
Stephens, James—*The Rocky Road to Dublin*
Teasdale, Sara—*Poems*
Love Lyrics
Flame and Shadow
Untermeyer, Louis—*Modern American Poetry*
Modern British Poetry
Widdemer, Margaret—*Haunted Hour*
Wilkinson, Marguerite—*Contemporary Poetry*
Yeats, William B.—*Poetical Works*

Such, then, are the major sources of materials. The time of the unit (quantitative) is four weeks in length, five class periods per week. The leading pupil activities are as follows:

A. Major activities: (1) Silent reading (careful, cursory, consultative, supplementary); (2) Interpretative reading; (3) Listening to interpretative reading; (4) Informal discussion; (5) Formal discussion.

B. Supplementary activities: 1. Conferring; 2. Planning; 3. Organizing; 4. Visualizing what is read; 5. Interpreting what is read; 6. Browsing; 7. Selecting—poems, illustrative passages, etc.; 8. Evaluating; 9. Formulating opinions; 10. Telling theme; 11. Analyzing; 12. Comparing; 13. Contrasting; 14. Memorizing; 15. Making special oral reports; 16. Writing special reports; 17. Listing poems read; 18. Making collections of poetry; 19. Keeping notebooks or diaries; 20. Writing verse.

The materials presented are chiefly poems, but in column two on the following pages are listed important objects of attention such as qualities, ideas or elements of the poems indicated in column three. Other worthy objects of attention may well arise. Those given are suggestive rather than comprehensive.

Column four is self explanatory. The activities are intended to supplement by individual projects the core activities (column one) which are largely of group nature. The contents of column four may be expanded or condensed; the more they are expanded the richer the course will be. The poems listed in the fourth column are to be found in the core books or in those in the supplementary list appended.

LYRICS, INCLUDING SONGS—FIVE DAYS

FIRST DAY

OBJECTIVES: 1. Seeing a lyric poem as such.
2. Observing rhythm in songs.
3. Observing reality of characters presented.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	*Activities*
1. Listening and participating in informal discussion led by teacher (25 minutes) Note 1	Personal element, emotion, spontaneity, melody	Masefield: "Sea Fever," Untermeyer, p. 359	Exploratory reading in current periodicals
	Melody, spontaneity	Watson: "Song" (April), Untermeyer, p. 303	Making individual anthologies of current poetry
	Melody, exhilaration	Young: "Mountain Speed," Brown, p. 551	*Additional Poems to Read*
	Melody, theme	Crapsey: "Vendor's Song," *Oxford Book*, p. 601	Kipling, "Seal Lullaby"
	Folk theme, refrain	Dunbar: "A Corn Song," *Oxford Book*, p. 536	Irvin, "Blessing the Dance"
	Character	Robinson: "Richard Cory," Untermeyer, p. 109	De la Mare, "Old Susan"
	Character	Benet: "Portrait of a Boy," Untermeyer, p. 252	Frost, "Death of the Hired Man"
	Character, emotion	Kipling: "Gunga Din," Untermeyer, p. 318	Hodgson, "Time You Old Gypsy Man"
2. Planning work (10 minutes) Note 2			Dunbar, "Lullaby"
3. Silent reading (15 minutes) Note 3	Character revealed through poetry	Reading in Untermeyer, Brown, Sperlin, Hanes and McCoy, etc.	Teasdale, *Love Songs*

NOTE 1. The teacher's efforts the first day are largely directed toward motivating the reading of poetry. She will read interpretatively the poems selected and manifest her personal interest in them by sympathetic rendition rather than by direct statement. The class may follow her reading with open books. Although the majority of the selections named are from Untermeyer, materials from the other anthologies may be used if Untermeyer is not available.

NOTE 2. In making the assignment directing reading of magazine poetry as a basis for discussion of current poems during class periods each Friday, the teacher will do well to have on her desk magazines containing representative poems as examples. She may read one poem or the titles of several or name authors, if well known. Committees may be arranged for gathering, selecting, typing, and presenting such current poetry as the individual members find and bring in.

NOTE 3. During the silent reading each pupil will find at least one poem which definitely reveals a trait or traits of character. He should make a note of the poem, author, anthology, page, and type of character. Ask each to be ready tomorrow to discuss in one or two sentences the question, "Is the characterization true to life?"

LYRICS, INCLUDING SONGS—FIVE DAYS

SECOND DAY

OBJECTIVE: Seeing moods of men in industry and war.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Reciting Pupil discussion (10 minutes) Note 1	Characters revealed	Poems read yesterday	*Activities* Planning 15 minute song program for Friday. Note 2
2. Listening and participating in discussion (10 minutes)	Mood, sincerity, central thought	Masefield: "Consecration," Untermeyer, p. 358	Keeping a diary or notebook—Recording poems read, individual comments, reactions, etc.
	Mood	Sandburg: "Noon Hour," *Chicago Poems,* p. 169	Preserving illustrative material
	Mood, imagery, idealism	McCrae: "In Flanders Field," Untermeyer, p. 346	*Additional Poems to Read* Sandburg, "People Who Must," "Manual System"
	Idealism, theme	Lindsay: "Abraham Lincoln Walks at Midnight," *Oxford Book,* p. 602	Untermeyer, "Caliban in the Coal Mines" Widdemer, "Factories" Monroe, "The Turbin" Brooke, "The Soldier" Gibson, "The Question," ....., "Battle" Colum, "An Old Woman of the Roads" Auslander, "The Riveter" Sassoon, "The Kiss"
3. Planning work (5 minutes) Note 2			
4. Silent reading (25 minutes) Note 3	Contrasting moods in two poems	Read in core books	

NOTE 1. Not all pupils will recite in the ten minutes allotted, but individual readers' participation will be stimulated.

NOTE 2. A general announcement of Friday's program may be made and then the detailed plans put into the hands of a committee who may confer with the teacher in the latter part of the period. The list of songs in Rich, pp. 120-21, may be helpful.

NOTE 3: If it seems desirable to have a reaction from each pupil at this time, ask each to write a concise contrast, not over thirty or forty words, of moods found in the two poems during silent reading.

LYRICS, INCLUDING SONGS—FIVE DAYS

THIRD DAY

OBJECTIVE: Viewing nature in lyric poems.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	*Activities*
1. Reciting Pupil discussion or reading aloud from paragraphs written yesterday (5 minutes) Note 1	Contrasting moods	Poems read yesterday	Memorizing favorite poems Choosing topics of personal interest for oral eprorts
2. Listening and participating in discussion (20 minutes)	Imagery	Housman: "Loveliest of Trees," Brown, p. 434	*Additional Poems to Read* Frost, "Birches"
	Symbolism	Sarett: "Four Little Foxes," Brown, p. 281	Ficke, "Loreine: A Horse" Sarett, "Hollyhocks"
	Imagery, tone color	De la Mare: "Silver," Untermeyer, p. 349	Lowell, "Wind and Silver" Kreymborg, "City Sparrow"
	Imagery	Sandburg: "Fog," Untermeyer, p. 151	Frost, "The Road Not Taken" Yeats, "The Lake Isle of Innisfree"
	Imagery	Bynner: "Ghosts of Indians," Brown, p. 89	Monro, "Dog"
	Melody, diction	Garland: "Color in the Wheat," Hanes and McCoy, p. 177	O'Neill, "Birds" Shaw, "Who Loves the Rain"
	Meter, rhythm	Carman: "A Vagabond Song," Untermeyer, p. 95	Scott-Hopper, "Very Nearly" Chesterton, "The Donkey"
3. Planning work (10 minutes) Note 2			Teasdale, "Spring Night"
4. Selecting (15 minutes) Note 3	A favorite poem Material for oral report		

NOTE 1. The written paragraphs may be collected, read by the teacher and returned on the following day during conference.

NOTE 2. Begin plans for oral reports with which the unit is to conclude. Each pupil will select a topic in the development of which he will read widely to gather material. The topic may be such as *nature, industry, war, the West, state poetry, odes, songs, sonnets,* or an intensive study may be made of the work of one author. Urge the pupils to find their own topics. Each pupil will follow a prescribed system for taking notes on cards to be thoroughly discussed in class. Encourage them to explore home and public libraries as well as current magazines for materials.

NOTE 3. Suggest that pupils make permanent possession of their favorite poems by memorizing. During the silent reading today they may decide which poems are favorites and why. In the remainder of the period they will browse about and explore for material and topics for oral reports.

LYRICS, INCLUDING SONGS—FIVE DAYS

FOURTH DAY

OBJECTIVES: 1. Viewing nature as revealed by early poets.
2. Making plans for oral reports.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	*Activities*
1. Listening and participating in discussion (20 minutes) Note 1	Melody, tone color	Tennyson: "The Bugle Song," Rich, p. 118	Bringing Current poems and magazines to committee
	Melody	Hardy: "Weathers," Brown, p. 423	Typing poems for class or bulletin board
	Theme, mood	Browning: "Home-thoughts from Abroad," Sperlin, p. 179	Committee conferences: Song program; Current poetry interpretation; Bulletin board exhibit
	Mood	Burns: "To a Mouse," Sperlin, p. 46	*Additional Poems to Read*
	Melody, tone color	Shakespeare: songs of spring and winter from *Love's Labours Lost*	Browning, Song from *Pippa Passes*; Burns, "To a Mountain Daisy"; Shakespeare, "Fairy Lullaby" (M. N's. D.), "Marching Song of Autolycus" (W's. T.), "The Greenwood Tree" (A. Y. L. I.), "Ariel's Song" (M. N's. D.)
2. Planning work (5 minutes) Note 2			
3. Silent reading and cenference (25 minutes) Note 3			

NOTE 1. After reading "The Bugle Song," the teacher will direct the pupils' attention to the different sources of melody, such as rhyme, rhythm, metrical variation, diction, repetition of letters, words and lines.

NOTE 2. During reading period today ask the pupils to find a melodious poem and to make an analysis of the sources of its melody. When this has been done, individual reading may continue.

NOTE 3. One at a time the pupils will come to the teacher for conference concerning choice of topics and plans for oral reports. At the beginning of each conference the teacher will return the pupil's contrast written on the third day and make any appropriate suggestions for individual study. Pupils responsible for the Friday program may need to have committee conferences.

LYRICS, INCLUDING SONGS—FIVE DAYS

FIFTH DAY

OBJECTIVES: 1. Enjoying musical interpretation of songs with literary value.
2. Listening to interpretation of current poems.
3. Making plans for oral reports.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Presenting song program—individually or on victrola (10 minutes)			*Activities*
2. Listening to song program			Composing simple melodies for short lyrics
3. Interpretative reading (10 minutes)			Expressing personal feeling in verse, perhaps on a favorite animal
4. Listening to interpretative reading			*Additional Poems to Read*
5. Open discussion (10 minutes) Note 1			See list in Rich, pp. 145-48
6. Silent reading and conferences continued as on previous day (20 minutes)			*Prose Reading*
			See list in Rich, pp. 405-407 or in Sperlin, pp. 356-357 Note 2

NOTE 1. First, encourage discusson of poems presented. Then, since this is the first of the series of interpretative readings, suggestions and constructive criticisms should be made by pupils and teacher in order that the future programs may be improved in quality.

NOTE 2. Since four weeks of lyric poetry will prove rather arduous for some pupils, a little easy prose reading in anticipation of the next unit may be interspersed for the sake of variety. The lists cited contain the names of suitable novels.

ODE—THREE DAYS

SIXTH DAY (beginning second week)

OBJECTIVE: Viewing odes (I. praising people and things).

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Listening and participating in informal discussion led by teacher (20 minutes)	Praise, enthusiasm, spontaneity	Bynner: "A Farmer Remembers Lincoln," Untermeyer, p. 171	*Activities* Finding and bringing to class other Lincoln poems Making a bulletin board exhibit or an anthology of Lincoln poems Judging whether or not these Lincoln poems are odes
	Praise, exaltation, restraint	Robinson: "The Master," Untermeyer, p. 106	
	Praise, sincerity, emotion	J. S. Untermeyer: "Autumn" (To My Mother), Untermeyer, p. 198	*Additional Poems to Read* Meynell, "The Shepherdess" Shelley, "To a Skylark" Frost, "To the Thawing Wind" Keats, "Ode on a Grecian Urn" Thompson, "To a Snowflake"
	Praise, figurative language	Shelley: "The Cloud," Sperlin, p. 43	
2. Planning work (10 minutes) Note 1			
3. Silent reading and notebook inspection (20 minutes) Note 2	Character revealed in odes—symbols used	Markham: "Lincoln, the Man of the People," Rich, p. 81	

NOTE 1. Assign for reading and discussion the following day Markham's "Lincoln, the Man of the People." Note characteristics of Lincoln, symbols used and figurative language.

Direct pupils to have notes for oral reports ready for inspection on the following day.

NOTE 2. During silent reading period pupils may read for foregoing assignment or they may continue reading for oral reports. If only a few books are available, some may do one thing and some the other.

Pupils will present notebooks, diaries or individual projects to the teacher for casual inspection. The teacher will encourage individual work with friendly suggestion and comment.

ODE—THREE DAYS

SEVENTH DAY

OBJECTIVES: 1. Viewing odes (II. reflective)
2. Identifying odes.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	*Activities*
1. Reciting (10 minutes)	Artistry	Markham: "Lincoln, the Man of the People"	Writing ode to some national character, such as Lindbergh, to some citizen known and admired, or to some one more intimately known
2. Listening (20 minutes)	Theme, mood, structure	Moody: "On a Soldier Fallen in the Philippines," Untermeyer, p. 101	
	Theme, mood, structure, metaphors	Brooke, "The Great Lover," Untermeyer, p. 401	*Additional Poems to Read*
	Theme	Golding: "Ploughman at the Plough," Untermeyer, p. 422	Gilder, "Ode" Markham, "The Man with the Hoe" Moody, "The Daguerreotype" Knibbs, "Burro"
	Theme	O'Shaughnessy: "Ode," Untermeyer, p. 295	Colum, "The Plougher"
3. Silent reading: Finding an ode Inspection of notes (20 minutes) Note 1	Central thought, form, figures of speech	Read in anthologies (not Rich)	

NOTE 1. Pupils read in anthologies to find an ode. Prepare to tell its central thought, its structure and any striking figures of speech.

While the pupils read, the teacher will check over one or two cards for each pupil to be sure that each is being thorough and systematic in note taking.

ODE—THREE DAYS

EIGHTH DAY

OBJECTIVE: Viewing odes. (III. Commemorating special occasions.)

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	*Activities*
1. Oral presentation of memorized lyrics (10 minutes) Note 1	Beauty of poems	Poems chosen by pupils	Finding and bringing current poetry to committee Committee conference on Friday's program
2. Discussion of odes read yesterday (10 minutes)	Central thought, structure, beautiful figures of speech		*Additional Poems to Read* Housman, "1887" Tennyson, "To Dante"
3. Listening (10 minutes) Note 2	Purpose, theme, structure	Dryden: "Alexander's Feast," Rich, p. 67	
4. Silent reading (20 minutes)	Material for oral reports		

NOTE 1. The memorization of favorite lyrics has been previously suggested to the pupils. They may be presented to the class or to the teacher, depending upon the quality of the oral interpretation. The teacher must decide this with reference to each pupil's presentation. In case they are presented to the teacher only, increase the silent reading to thirty minutes. The lyrics may be heard individually at the teacher's convenience.

NOTE 2. Read only enough of "Alexander's Feast" to illustrate the type and the typical ode structure. Cite other famous commemorative odes.

ELEGY—THREE DAYS

NINTH DAY

OBJECTIVE: Viewing reflections on death as revealed in the elegy.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Listening		Original lyrics by pupils in previous classes. (In manuscript and in school magazine)	*Activities* Committee preparing for Friday's current poetry interpretation: selecting reading aloud interpreting
a. (10 minutes) Note 1			
b. (15 minutes)	Theme, mood, personality of author	Seeger: "I Have a Rendezvous with Death," Untermeyer, p. 226	*Additional Poems to Read* Teasdale, "The Silent Battle" Millay, "Epitaph" Mackaye, "To the Fire Bringer"
	Theme, imagery	Kilmer: "Rouge Bouquet," Oxford Book, p. 626	
2. Planning work (5 minutes) Note 2			
3. Silent reading (20 minutes)	Theme, symbols, sincerity, consolation at end	Brooke: "The Dead," Rich, p. 109	

NOTE 1. As a motive for expressing their own feelings in verse, the teacher will read to the pupils original lyrics written by previous classes.

NOTE 2. Assign Brooke's "The Dead" for reading; discussion to be on third day of elegies. The pupils may read this poem or read for reports during class hour.

ELEGY—THREE DAYS

TENTH DAY

OBJECTIVE: 1. Viewing selected current poetry.
2. Viewing reflections on death including those in some earlier elegies.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Oral interpretation of some current poetry (15 minutes)			*Activities* Expressing personal feelings in verse Making an anthology of pupils' original verse. Select a staff of editors to publish the material.
2. Listening and participating in discussion	Melody, central thought	Housman: "With Rue My Heart Is Laden," Brown, p. 434 Austin: "Lament of a Man for His Son," Brown, p. 68 Henley: "Margaritae Sorori," Brown, p. 42 Scott: "Coronach," Rich, p. 103 Burns: "A Bard's Epitaph," Rich p. 102 Wordsworth: "She Dwelt Among the Untrodden Ways," Rich, p. 103	*Additional Poems to Read* Millay, "Dirge" Sandburg, "Cool Tombs" Scollard, "On an American Soldier Fallen in France" De la Mare, "How Sleep the Brave" Burns, "Highland Mary" Browning, "Prospice" Arnold, "Requiescat"
a. Current poetry (10 minutes)			
b. Short elegies (25 minutes)			

ELEGY—THREE DAYS

ELEVENTH DAY (beginning third week)

OBJECTIVE: 1. Identifying elegies.
2. Planning and reading for oral reports.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Discussion (10 minutes) Note 1	Ideas reflected, elegy characteristics	Brooke: "The Dead"	*Activities* Making a bibliography of the best magazine sources of current poetry
2. Silent reading (10 minutes) Note 2	An elegy not listed as such—Theme	Read in anthologies other than Rich	Making a record in diary or notebook of "Poems I Want to Read"
3. Reading and planning (30 minutes)	Oral reports		
4. Conferences Note 3	Oral reports		

NOTE 1. Discussion during this class period will largely summarize what has been learned concerning the elegy and prepare for the second activity—that of finding elegies not previously discussed or labeled as elegies. The latter is really a test to enable teachers to ascertain how much pupils are growing in appreciation.

NOTE 2. Time divisions are merely suggestive, but the time for finding an elegy should be limited so that pupils do not dally over it.

NOTE 3. Conference concerning oral reports may begin after discussion and continue throughout the period or as long as teacher or pupils see a need for them. Some reports should now be taking shape for presentation to the class.

ORAL REPORTS—THREE DAYS

TWELFTH DAY

Objective: Organizing oral reports.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Listening to lyrics (10 minutes) Note 1	Original lyrics		*Additional Readings* Hughes Mearns, *Creative Youth* *The Scholastic* *The Magazine World* *St. Nicholas*
2. Reading, conferring, organizing (40 minutes) Note 2	Oral reports	From own school magazine or paper	

NOTE 1. Lyrics written by students whom the pupils know or have heard of often serve as incentives to pupils. The teacher may place on shelves, and suggest the pupils' reading, other publications containing student lyrics such as the poems suggested in the right hand column.

NOTE 2. The remainder of the period may be spent in organizing material for oral reports, some of which are to be presented on the following day.

ORAL REPORTS—THREE DAYS

THIRTEENTH AND FOURTEENTH DAYS

OBJECTIVE: Expression in the form of oral reports on individual topics.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Oral expression (30 minutes) Note 1 2. Informal discussion (20 minutes) Note 1	Ideas developed in reports		*Activities* Finding and bringing current poetry to committee. Committee procedure as before Working on individual projects discovered by pupils during the past two weeks Note 2 *Additional Readings* Milne, *When We Were Very Young* Ruskin, *Dame Wiggins of Lee* Drinkwater, *All About Me* Van Doren and Lapolla, *A Junior Anthology of World Poetry* Note 3

NOTE 1. The division of time between the making of the reports and the discussion of them is made arbitrarily here. Perhaps five or six reports, if limited to five to ten minutes each, can be presented in fifty minutes. Each pupil should be allowed to complete his report; thereafter the class and the teacher may enter into a friendly discussion of each report before the next is begun.

NOTE 2. Wherever possible, allow pupils to discover projects for themselves. During the conference period the teacher may do much toward discovering individual tastes and abilities. In conference period, too, she can often suggest activities that will prove attractive to pupils. Now that oral reports are being completed, the time is suitable for beginning work on individual projects although they have been planned earlier.

Untermeyer, pp. 476-77, has some helpful suggestions.

NOTE 3. Pupils who have any idea of teaching, or who have younger brothers or sisters, may easily be interested in juvenile poetry. A few readings in this field are suggested.

Also, see Untermeyer, pp. 452-55.

SONNETS—THREE DAYS

FIFTEENTH DAY

Objectives: 1. Viewing selected current poetry.
2. Viewing the sonnet.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Oral interpretation of current poems (15 minutes)			*Activities* Memorizing another lyric Preparing a class anthology of the current poetry which has been collected
2. Listening and perticipating in discussion (20 minutes)	Theme Characteristics of the sonnet	LeGallienne: "Brooklyn Bridge at Dawn," Rich (*Classified Types*) p. 236	*Additional Poems to Read*
		Hagedorn: "Doors," Brown, p. 159	Van Dyke, "Work" Brooke, "Sonnet"
3. Silent reading (15 minutes)	Central idea, meter, rhyme, thought divisions	Untermeyer: "Voices," Rich, p. 92	Sorley, "To Germany" Brooke, "The Soldier" Sassoon, "Dreamers" Aldrich, "Enamored Architect of Airy Rhyme"

SONNETS—THREE DAYS

SIXTEENTH DAY (beginning fourth week)

OBJECTIVE: 1. Viewing the sonnet.
2. Identifying sonnets.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Reciting and asking questions (10 minutes)	Sonnet form	Untermeyer: "Voices"	*Activities* Collecting magazine articles, biographical sketches and press notices conerning modern poets.
2. Listening and participating in discussion (25 minutes)	Theme, mood	Reese: "Tears," Untermeyer, p. 89	*Additional Poems to Read* Robinson, *Sonnets*
	Theme, symbolism	Sterling: "The Black Vulture," Untermeyer, p. 102	Meynell, "Renouncement" Cullen, "From the Dark Tower
	Theme	Moore: "Joan of Arc, 1926," *Third Book of Modern Verse*, p. 210	Wylie, "Sonnet" Reese, "Spicewood"
3. Silent reading (15 minutes)	To find a sonnet	Read in anthologies	

SONNETS—THREE DAYS

SEVENTEENTH DAY

Objective: Viewing selected classic sonnets.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Discussion and questions (10 minutes)	Sonnets	Those read yesterday	*Activities* Finding and bringing current poetry to committee who proceed as before
2. Listening and participating in discussion (20 minutes)	Theme, mood	Shakespeare: "When in Disgrace With Fortune," Rich, p. 88	*Additional Poems to Read* Wordsworth, "To Milton," "The World Is Too Much With Us"
	Theme, mood	Milton: "Sonnet on His Blindness," Rich, p. 89	Keats, "The Grasshopper and Cricket"
	Theme, figurative language	Keats: "On First Looking Into Chapman's Homer," Rich, p. 90	Rosetti, "The Sonnet" Mrs. Browning, "Sonnet from the Portuguese"
3. Silent reading and conference (20 minutes)	Oral reports Individual reading		

REPORTS AND REVIEW—THREE DAYS

EIGHTEENTH AND NINETEENTH DAYS

OBJECTIVE: Expression in the form of oral reports on individual topics.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Oral expression (30 minutes) 2. Informal discussion (20 minutes)			*Activities* Bringing to class the finished products of any individual projects. Displaying them on reading table or on bulletin board, etc. *Additional Reading* Auslander, *The Winged Horse* Wilkinson, *New Voices*

REPORTS AND REVIEW—THREE DAYS

TWENTIETH DAY

Objectives: 1. Reviewing lyric poetry.
2. Reviewing selected current poetry.

Core Activities	*Core Materials*		*Enrichment and Individualization*
	Objects of Attention	*Poems*	
1. Informal discussion (25 minutes)	Lyric poetry Types Characteristics Favorite authors Their poems Favorite poems Best liked Most musical Most emotional Best phrasing		*Activities* Selecting best liked current poems and writing reasons Making a list of striking phrases or figures of speech *Reading* Selections for next unit (prose)
2. Oral interpretation of memorized poems (10 minutes)			
3. Interpretation and discussion of current poetry (15 minutes)			

Units in English Correlated With Vocational Guidance[1]

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The course includes five units, each designed to occupy the class for one week: I. Ideals of Business; II. Characters of Successful Men; III. Choosing a Vocation; IV. Salesmanship; V. Other Vocations.

The curriculum consists primarily of pupil experiences as represented in column 1 below. Throughout the five units the experiences are repeated in cycles with the thought of guiding the pupils through action patterns of good workmanship. Informational objectives are represented in column 2. Materials, selected largely from the publication of the North Central Association list of English readings for the vocational objectives and including books both of the work-type and the leisure-type of reading, are named in column 3.

[1]This is a second study relating to English and is sponsored by the Committee on Standards for Use in the Reorganization of Secondary School Curricula. See page 442 for price of reprints on English material.—The Editor.

UNIT I. IDEALS OF BUSINESS

OBJECTIVES:

1. Knowledge of occupations
2. Knowledge that functions in the discovery of abilities and dispositions
3. Useful English skills and habits
4. Worthy ideals, attitudes, appreciations

Core Activities	*Objects of Attention*	*Materials*	*Enrichment and Individualization*
Class consideration (An example of direction of procedure for all reference work.) 1. Students and teacher *read silently* a typewritten copy of reference 2. *Oral reading* by teacher or student 3. *Informal discussion* to bring out: 1. Major evaluation of ideas 2. Minor 4. *Memorization* of a major idea 5. *Organization* of ideas in precise outline worked out on board. When each is preparing an outline, conferences held with teacher.	1. The romance and fascination of daily tasks 2. Communicating This will be a common object of attention for each cycle of material. It is to be remembered that although pupils are to be vocationally guided through supplementary reading, part of vocational training is learning to sell one's abilities and acquiring knowledge. Communicating is a selling activity. Since guidance takes place through the medium of an English class, guidance itself becomes an object of attention.	References 1. *The Romance of a Great Store*, Hungerford 2. *My Life and Work*, Ford 3. *Girls Who Did*, Ferris and Moore 4. *Making Life Worth While*, Fairbanks 5. *Getting the Most Out of Business*, Lewis 6. *In the Service of Youth*, Opdycke	Additional activities and materials I. Reading books such as: 1. *Rise of Silas Lapham*, Howells 2. *We and Our Work*, American View Point Society 3. *Principles of Economics*, Hughes 4. *Gilded Age*, Mark Twain 5. *Fields of Work for Women*, Miriam Simmons II. Current business magazines: 1. *System* 2. *Independent Woman* 3. *World's Work*

UNIT I. IDEALS OF BUSINESS—Continued

Core Activities	*Objects of Attention*	*Materials*	*Enrichment and Individualization*
6. *Rethinking* with mental set of giving materials as an oral report 7. Class *organized into meeting for* giving reports Chairman Critics 1. Of subject content 2. Of language and manner of delivery Delivery of talks Discussion of talks	3. Definitely relating theories and information secured from floor talks to specific problems arising in the practice work which the pupils carry on in the down town stores. Class has talks on Tuesday, after they have been working in stores on Monday.		III. Papers issued by stores: Preparation for effective silent reading. Policies and slogans are often so worded that their effect is lost in telling, unless memorized. IV. Other magazines: 1. "Salesmanship," *Magazine World,* October, 1930 2. "Who Sets Fashions and How?" *Readers Digest,* February, 1930 3. "The Machine, Servant or Master," *Scribners',* July, 1930 4. *B. & B. Revealer,* Store Mazagine published by Boggs and Buhl, Pittsburg, Pa. 5. *System,* January, 1930 6. *Dry Goods Economist,* September, 1930 7. *Nation's Business,* October, 1930 8. *Review of Reviews* 9. *Women's Wear Daily*

UNIT II. CHARACTER STUDY OF SUCCESSFUL MEN

Core Activities	*Objects of Attention*	*Materials*	*Enrichment and Individualization*
Library reference work 1. *Acquiring information* by reading; copying on cards lines which reveal character 2. *Organization* Make generalized statements 1. Use these lines as evidence 3. *Rethinking* for reproducing ideas 4. *Reproducing ideas* 5. *Discussion*	1. Men are successful who, although they work hard, think hard in connection with this work. 2. Men are successful who work with idea of giving service, rather than with an idea of amassing a fortune. 3. Men who are able to overcome failures are successful. 4. Men who have or have developed a sense of values are most successful.	*Thomas A. Edison*, McFee *The Girl Who Earns Her Own Living*, Richardson *The Book of Courage*, Hagedorn *How to Choose Your Career*, Ivuy *John Wanamaker, A Study*, Appel *A Short Life of Mark Twain*, Paine *Choosing a Vocation*, Parsons *The Right Job*, Blackford and Newcomb *Paths to Success*, Black	Interviewing and reporting after visits in the training department of large department stores, such as they have in Marshall Field's, Chicago, or in Stewarts, Louisville, Kentucky.

UNIT IV. SALESMANSHIP

Core Activities	*Objects of Attention*	*Materials*	*Enrichment and Individualization*
Activities as in Units I-II 1. *Reading for fun* 1. Short stories 2. Dialogues 3. Novels 2. *Informal dramatization*	Old and new idea of salesmanship contrasted Everyone is a salesman Training for salesmanship "Tell me what you do in your leisure time and I'll tell you what you are."	*How to Find the Right Vocation,* Kitson *Succeeding with What You Have,* Schwab *The Book of Business Etiquette,* Three Business Men *How to Sell at Retail,* Charters *Retail Selling,* Norton Gym & Co. *Elements of Retailing,* Lujh *Selling at Retail,* Pelz	Visit an employment agency Find vocations for which there is a demand and salaries of such Departmental conferences with leaders from local retail shops Visits to other departments in school to study relationship of selling other types of working activities Visit Newspaper Advertising Division and find out terms, prices, space and cost of running an advertisement Lecture by fur specialist, illustrated by various and valuable fur pelts Excurson to accounting department of local stores Excursion to local stores to see work done by non-selling force Make a note book of all information pertinent to salesmanship

UNIT III. CHOOSING A VOCATION

Core Activities	*Objects of Attention*	*Materials*	*Enrichment and Individualization*
Activities as in Units I-II	1. It is better to choose a vocation than to hunt a job. 2. Choice of work depends upon: Requirements Advantages Disadvantages Worker's abilities Training required	*What Shall I Do With My Life,* Donnelly *Careers for Women,* Filene *The Young Man and His Vocation,* Harris *Building a Career,* Weaver *The Amazing Benjamin Franklin,* Smythe *America's Great Men and Their Deeds,* Mawry *Creeds of Great Business Men,* Barker *Heroes of Progress in America,* Morris *Heroes of Progress,* Tappan *Kings of Commerce,* Bridges and Teltman *Famous Leaders of Industry,* Wildman *Lives of Poor Boys Who Became Famous,* Bolton *Modern Great Americans,* Law	Taking a field trip through a store. Report on its organization and advertisement department. *Our Trip Through Field's,* Hull

UNIT V. OTHER VOCATIONS

Core Activities	*Objects of Attention*	*Materials*	*Enrichment and Individualization*
Activities as in Units I-II	A comparison of other vocations with salesmanship. Getting other persons' point of view. Intelligent living is made possible by associated lines of endeavor. Salesmanship is closely related to many other occupations. Successful mastery depends upon whole learning.	*Vocations for Girls,* Weaver & Byler *Profitable Vocations for Boys,* Weaver & Byler *Your Job,* Whitehead *How to Find the Right Vocation,* Kitson	In this unit of work the class may record a list of inspirational thoughts taken from articles as they prepare their talks; for example: "Let others tell of rain and showers." I only record the sunny hours." —King Edw. Sundial "Educated people must work." —Lincoln After class has given talks they may vote on the best speeches of which a bibliography is being kept. It is from this source that I've been able to give names of books and magazines.

Three Units in American Life as Interpreted in American Literature[1]

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This course of study is composed of three large units designed to illustrate prominent American characteristics, past and present, through the medium of American literature. Unit I, American Ideals, is planned to occupy the class for one semester and Units II and III, American Leaders and American Types, for one-half semester each.

Column I contains the fundamental characteristic which the teacher wishes to emphasize. The materials are to be found in columns 2, 4 and 5. Especial provision has been attempted in columns 3 and 5 for pupils of superior capacities.

This course of study is now in use in the Morgan Park Military Academy.

[1]This is another of the studies relating to curriculum reform being sponsored by the Commission on Unit Courses and Curricula. See page 442 for price of reprints on English material.—The Editor.

UNIT I. AMERICAN IDEALS

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
A. Loyalty 1. To home, home folks and the soil	Freeman, M. E. W., *The Revolt of Mother* Whittier, J. G., "Snow-bound" White, Wm. A., "Mary White"	Dramatize—Montague, M. P., "England to Amerca." Call on an "old settler" in your community. Contrast his description of a pioneer home with your own home. Make a blue print of a colonial house plan as well as that of an average home of today. Mould a landscaping plan for your ideal home. Choose some room in a home and lay out a plan for its furnishings, satisfying the laws of color and proportion. If possible, include samples of materials—drapes, etc. Prepare the budget required to furnish some room. Write a composition in which you compare the country and city home, including such things as: amount of land, cost of upkeep, transportation, size of rooms, amusements, affects on members of family.	Longfellow, "The Villige Blacksmith," "Hanging of the Crane," "My Lost Youth," "The Clock on the Stairs," Payne, J. H., "Home, Sweet Home." Bunner, H. C., "Home, Sweet Home with Variations." Riley, J. W., "Home at Night." Morley, C. D., *Songs for A Little House* (Selections), *Chimney Smoke.* Kilmer, I., "The House with Nobody In It." Peabody, J. P., "The House and the Road."	Cather, W., *O Pioneers!, My Antonia, Song of the Lark,* Rolvaag, *Giants in the Earth, Peder Victorious.* De La Roche, M., *Jalna.* Fisher, D. C., *The Home Maker.* Norris, K., *Mother.* Roosevelt, "Letters to His Children," "The Home of Theo. Roosevelt." Hubbard, Elbert, *Abe Lincoln and Nancy Hanks.* Goodsell, *A History of the Family as a Social Institution* (For that bright boy.) Asch, Sholom, *The Mother.*

UNIT I. AMERICAN IDEALS—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
2. To friends and loved ones	Foss, S. W., "The House by the Side of the Road." *Bible*, The Story of David and Jonathan (I Samuel, 18-19). Porter, S. (O. Henry), "The Gift of the Magi."	Make a scrapbook of popular ballads and songs in which the element of friendship or loyalty to loved ones is stressed. Write on the qualities of "My Best Friend," telling why he is your best friend.	Van Dyke, H., "A Mile with Me." Holmes, O. W., "The Boys." Emerson, R. W, "Friendship." *Bible*, Parable of Good Samaritan (Luke 10:30-37) (LH3) 89. Shakespeare, W., Sonnet XXX.	Longfellow, H. W., "Evangeline." Hawthorne, N., *The Scarlet Letter.* Smith, E. V., "Lijah." Montague, M. P., "England to America." Crothers, S. McC., *Among Friends.* Grayson, D., *Adventures in Friendship.* Holliday, R. C., *Peeps at People, Broome Street Straws.* Thoreau, H., *Brute Neighbors.* Morley, C. D., "Making Friends" (from *Essays*).

UNIT I. AMERICAN IDEALS—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
3. To clan—group, school, college, etc.	Paine, R. D., "The Freshman Fullback." Hay, John, "Jim Bludso and the Prairie Belle."	Make a model football field correct as to scale illustrating the "Freshman Fullback." Make a pasteboard model of such a Mississippi steamboat as the "Prairie Belle." Dramatize a half day's program in a school of 50 or 100 years ago. Prepare a scrapbook in which you contrast an old-time school with one of today in: structure, furnishings, teachers, method of government, subjects offered. Debate the advantages of old time and modern schools. Interview several successful men in your community regarding their views on the value of an education. Make a diagram of the duties of the home and the school in educating the pupil 100 years ago; today. Send to a number of life insurance companies, etc. to obtain data on earning power of schooled and unschooled persons.	Johnson, O., "The Football Game." Anon, *The New England Primer.* Eastman, "Indian Boys Training." Lincoln, A., *Autobiography.* Whittier, J. G., "In School Days." Paine, R. D., "A Schoolboy of Fifty Years Ago." Nicolay, H., *Boyhood of A. Lincoln.*	Eggleston, E., *The Hoosier Schoolmaster.* Eggleston, E., *The Hoosier Schoolboy.* Novels of Paine, R. D. and Barbour, R. H. Johnson, C., *Old Time Schools and School Books.* Patri, A., *A Schoolmaster in the Great City.*

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
4. To country.	Lincoln, A., "Gettysburg Address." Andrews, M. R. S., *The Perfect Tribute.* Bierce, A., "Horseman in the Sky."	Floor-talk on "My Story of the Unknown Soldier." Make a good-citizenship score card for Morgan Park cadets; for citizens over 21. Investigate the list of registered voters in your precinct, determine the percentage of those not registered. Examine one morning and one evening paper and list at least ten instances in which citizens have not been loyal to their government; ten in which they have been.	*The Declaration of Independence.* *The Preamble to the Constitution.* Lincoln, A., *Letter to Mrs. Bixby.* Hale, E. D., *The Man Without a Country.* Seeger, A., "I Have A Rendezvous with Death." Watterson, H., "How the National Anthem Was Written."	Sandburg, C., *Good Morning, America.* Crane, S., *The Red Badge of Courage* Harding, W. G., *"America's Unknown Soldier."* Fitch, C., *Nathan Hale* (Play)
5. To ideals (greatest of all)	*Bible,* Sermon on the Mount (Matt. v, vi, & vii). *Bible,* Paul's Essay on Love (I Corinth ii). Van Dyke, H., *The Other Wise Man.* Longfellow, H. W., "Excelsior." Hubbard, E., *A Message to Garcia.*	Dramatize a scene in the afterworld in which several leaders of former times defend their respective ideals. Floor talk on one man who was or is true to an ideal which you strongly admire. On an outline map of the U. S. locate five men (or ten) living between 1750-1850 who sacrificed for ideals. Do the same for period, 1900-30. Write a magazine or news article on the work of M. and Mme. Curie. List as many great Americans as you can who have not sacrificed something for their ideals.	McCarthy, J., "Joan of Arc." Runion, A. D, "Song of Panama." De Kruif, P., "Walter Reed." Hoffman, P., "The Civil Engineers." Moffett, C., "The Men Who Work on Bridges." Simms, E., "The Bridge Builders." Mason, G. S., "His Job." Reading recommended by the Science Department on some one man of science who has sacrificed greatly for his ideals.	Lewis, S., *Arrowsmith.* De Kruif, *The Microbe Hunters, The Hunger Fighters.* Morley, C. D., *Religio Journalistici.* Marte, B., *"Outcasts of Poker Flat."* Clemens, S. L., *Personal Recollections of Joan of Arc.* Lamb, H., *The Crusades* Bryan, *Edison, the Man and His Work.* Riis, J., *Making of an American.* Bok, E., *"Why I Believe in Poverty."* Lowell, J. R., *"The Vision of Sir Launfal."* Addams, J., *Twenty Years at Hull House.*

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
B. Fraternity—Democracy People working together for: 1. Independence a. Personal	Kipling, R., "If." Franklin, B., "Autobiography." "Resolutions Adopted by the Boy Scouts on Theodore Roosevelt." Stevenson, "A Dream of Freedom." (Play)	Debate or floor-talk on "Can I Be a Good Fellow and Be Independent?" Make a pictogram indicating the various people on whom you depend; do the same for those who depend on you. Debate or floor-talk on "The City Dweller Possesses Greater Independence than His Country Cousin." Trace, in a written composition, the effect that personal independence (or the lack of it) has had on the history of this country. Dramatize Stevenson's "A Dream of Freedom."	Hemans, F., "The Landing of the Pilgrims." Longfellow, H. W., "The Courtship of Miles Standish." Ward, N., "On Toleration of Religious Opinions." "Extermination of the Pequots."	Bradford, W., "Voyage of the Mayflower." Winthrop, J., "A Half Year in Massachusetts Bay." Morton, T., "Of a Great Monster Supposed to be at Ma-Re-Mont." Wigglesworth, M., "Epilogue to God's Controversy with New England." Edwards, J., "Sinners in the Hands of an Angry God."
b. State.	*United States Constitution.* *Illinois State Constitution.* Jones, "What Constitutes a State?"	Dramatize one of the Lincoln-Douglas debates. Motion Picture: "In the Glory of the Past" (National Cash Register Company.). Dramatize troubles existing between New York and Connecticut and New Jersey in 1785 when each sought complete independence (Cf Fiske: *Critical Period of American History,* p. 146). Draw a cartoon illustrating Mexico's attitude towards Texas' plea for independence in 1845.	Lincoln, A., "Second Inaugural Address." Longfellow, H. W., "The Ship of State." *The Constitution of Your Home State.* Caldwell, "A Citizenship Ballot." Hagedorn, "Schooling in Citizenship." Fesler, "A City of the Future." Hawthorne, H., "Your Best and Hardest Job." Campbell, E. F., *Our City Chicago* (selections).	Lowell, J. R., *Biglow Papers* (selections). Doane, "The Men to Make A State." Wilkinson, "The New City." Roosevelt, T., "Practical Citizenship." Altscheler, J., *The Quest of the Four, The Texan Scout."* Bryan, G. S., *Sam Houston.* Eckenrode, H. J., *Jefferson Davis, President of the South.*

UNIT I. AMERICAN IDEALS—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
c. National	Freneau, P. "The Rising Glory of America." Paine, T., *Common Sense.* Eliot, "The American Creed." McCrae, J., "In Flanders' Fields."	Cooperate with Military Department on "General Orders." Dramatize the signing of the Declaration of Independence (Cf. Stevenson, A., *Dramatized Scenes from American History.*) Put out a newspaper that might have been published in Boston or Philadelphia following the Declaration of Independence. Motion Picture: "Boston Tea Party," "Paul Revere's Ride." (Edited Pictures System) Motion Pictures: Boston and Lexington, Historic Philadelphia and Valley Forge. (Ford Educational Library Films) Floor talks by students who may have visited any historic spots.	Longfellow, H. W., "The Landlord's Tale." Henry, Patrick, *Speech Before the Virginia House of Burgesses.* Holmes, O. W., "Grandmother's Story of Bunker Hill." Hale, E. E., *The Man Without A Country.*	Jefferson, T., *Autobiography.* Hamilton, A.,*The Federalist.* Cooper, J. F., *The Spy, The Last of the Mohicans, Deerslayer.* Emerson, R. W., "Concord Hymn." Dwight, T., "Columbia." Boyd, J., *Drums.* Ford, P. L., *Janice Meredith.* Goss, W. L., *Jack Gregory.* Mitchell, S. W., *Hugh Wynne, Free Quaker.* Sabatini, R., *The Carolinian.* Churchill, W., *Richard Carvel.*

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
People working together for: 2. Equality a. Political	Lincoln, A., *Emancipation Proclamation.* Markham, E., "Lincoln, the Man of the People." Robinson, E. A., "The Master." Masters, E. L., "Anne Rutledge."	A Lincoln project—either reading or manual—such as making model of the Lincoln log cabin, etc. Memory work, The Gettysburg Address (if not done before). Chapel talk by one member of the class on Lincoln (other members helping to prepare him).	Webster, D., "Constitution and Union Speech." One biography of Lincoln from: Sanburg, C., *The Prairie Years.* Charnwood, Lord, *Abraham Lincoln.* Ludwig, E., *Life of Abraham Lincoln.* Tarbell, I., *In the Footsteps of the Lincolns.* Britt, A., *Lincoln for Boys and Girls.* Washington, B. T., *Up From Slavery.* Lindsay, V., "Abraham Lincoln Walks at Midnight."	Stowe, H. B., *Uncle Tom's Cabin.* Lowell, J. R., *Biglow Papers* (1st series). Whitman, W., *Civil War Poems.* Whittier, J. G., "Moral Warfare." Grant, U. S., *Memoirs.* Drinkwater, J., *Abraham Lincoln, Robert E. Lee.* Orth, S., *The Boss and the Machine.* Bierce, A., "Horseman in the Sky," *Can Such Things Be?* Page, T. N., *Marse Chan.* Babcock, *The Soul of Anne Rutledge.*

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
b. Prison reform	Sinclair, U., *The Cry for Justice* (selections).	Visit police station and county jail; write up account of your visit. Dramatize procedure of a criminal trial. Trace the steps from crime, through courts to prison. Make a chart indicating: (1) acts named as crimes in 1790; and (2) same for 1930. Write an editorial such as might have been written on prison conditions in 1830 (cf. Channing, *U. S. History*, IV.) If possible, listen to an address by a social worker on causes and treatment of juvenile delinquency. Picture graphically the work of such people as Thos. Mott Osborne, Elizabeth Fry, and Warden Lawes.	Osborne, T. M., *Within Prison Walls.* Wilde, O., *Ballad of Reading Gaol.* Towne, B,. *My Life in Prison.*	Tannenbaum, *Wall Shadows.* Bacon, *In the Clutch of Circumstance, By a Burglar.* Coe, C. F., *Me, Gangster, The River Pirate.* London, J., *Tales of the Fish Patrol, John Barleycorn, The Star Rover.* Earle, *Curious Punishments of of By-Gone Days.*
c. Woman suffrage	Shaw, A. H., "Drama in the Lecture Field."	Look up and write a short biography of one famous American woman leader: Dolly Madison Frances Willard Anna Howard Shaw Carrie Nation Etc.	Magazine reading on prominent women of today, in arts, business, philanthropy, etc.	

UNIT I. AMERICAN IDEALS—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
d. Equality for all the world. World war.	Markham. E., "The Man with the Hoe," "Brotherhood." Sandburg, C., "Cool Tombs," "Grass." Empey, G., "The Coward."	Five minute floor talks on causes of the World War. Interview two war veterans of the world war and one of the Spanish-American, and if possible one of the Civil War. From the interviews write a criticism of modern warfare. Make a model of No Man's Land as it must have looked on the morning of Nov. 11, 1918. Motion Pictures: "What Price Glory?" (Fox Film Co.); "The Big Parade" (M-G-M Co.).	Sassoon, S., "Working Party" "The Rearguard" "Death-Bed" "Counter-Attack" "Aftermath." Seeger, A., "I Have A Rendezvous with Death."	Hendrick, B., *Life and Letters of Walter Hines Page.* Aldrich, M., *Hilltop on the Marne.* Clarke, G. H., *Treasury of British and American War Poetry.* Service, R. W., *Rhymes of a Red Cross Man.* Gathany, *American Patriotism in Prose and Verse.* Graves, R., *Secrets of the German War Office.* Gerard, J., *My Four Years in Germany.* Wharton, J. B., *Squad.* Springs, E. W., *War Birds.* Wilson, W., *The New Freedom.* Stallings, L., and Anderson, *What Price Glory.* Hall, N., *High Adventure.*

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
A. Social and Economic Leaders ers	Meadowcroft, W. H., *Boy's Life of Edison (selections).*	Reading and reporting magazine articles and biographies. Especial emphasis on types of success articles found in "American Magazine" and "Saturday Evening Post." Make a scrap book illustrating "My Idea of Success in Life." Map of U. S. with chief products of each section and economic leaders' pictures imposed. Motion Pictures: "Making Telephone History," New York (Amer. Tel. and Tel. Co.). "The Pace of Progress," (Chicago, No. Shore and Mil. Ry.). "The Iron Horse" (Fox Films). "King of the Rails" Schenectady, N. Y. (Gen. Electric Co.). "Evolution of Travel" New York (Gen. Vision Co. 104 W. 42nd St.). "New York City—Wall St. and the Elevated" "New York City—Transportation." Dayton (National Cash Register Co.).	Hyde, M., *Modern Biography (amy).* Forman, *Stories of Great Inventions.* Moody, J., *Masters of Capital.* Orth, S. P., *Armies of Labor.* At least one biography from each group, i. e. economic and social Social: Horace Mann Jane Addams Upton Sinclair John Dewey Benjamin Franklin S. S. McClure P. T. Barnum Cornelia S. Parker Wilfred Grenfell Anthony Comstock Susan B. Anthony Francis Willard Etc. Economic: J. J. Hill J. D. Rockefeller Comm. Vanderbilt Van Schweringens Gen. Atterbury Henry Ford Harvey Firestone Thomas Edison Charles Steinmetz Robert Fulton Charles Lindbergh Eli Whitney Elias Howe Etc.	Burns, E. E., *The Story of Great Inventions.* Beard, M., *A Short History of the American Labor Movement.* Carnegie, A., *Autobiography.* Gompers, S., *Seventy Years of Life and Labor.* Hovey, C., *Life Story of J. Pierpont Morgan.* Iles, G., *Leading American Inventors.* Pupin, M., *From Immigrant to Inventor.* Tarbell, I. M., *Life of Elbert H. Gary, History of the Standard Oil Co.* Warman, Cy., *Story of the Railroad.* Widman, E., *Famous Leaders of Industry.* Bond, A. R., *Pick, Shovel, and Pluck.* Hall, H. S.,*Steel Preferred.* Merwin, S., and Webster H. K., *Calumet "K".* Pendexter, H., *Pay Gravel.* Spearmen, F. H., *The Mountain Divide, The Nerve of Foley.* White, W. A., *A Certain Rich Man.* Jenks, *Great Fortunes.* Riis, J., *How the Other Half Lives, Making of an American.* Nearing, S., *Poverty and Riches.* Keller, H., *Story of My Life.* Stern, *My Mother and I.*

UNIT II. AMERICAN LEADERS—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
B. Political Leaders	Parkman, "Citizen of the World (Hoover)" (from *Heroes of Today*).	Composition: "Which of my classmates I think will make a good political leader and why?"	Bachellor, I., *A Man for the Ages.* Stevenson, B., *Poems of American History* (*pp.* 384-557). Washington, G., "Farewell Address." One biography of a political leader such as: Alexander Hamilton Thomas Jefferson George Washington Abraham Lincoln Theodore Roosevelt Woodrow Wilson W. J. Bryan James G. Blaine Mark Hanna Etc.	Churchill, W., *The Crisis, The Crossing.* Atherton, G., *The Conqueror.* Ford, P. L., *The Honorable Peter Stirling.* Lewis, *The Boss.* Tarkington, B., *The Gentleman from Indiana.* Charnwood, G. R. B., *Theodore Roosevelt.* Williams, W. C., *William Jennings Bryan.* Palmer, F., *The Big Fellow.* Marshall, E., *Seward Folly.*
C. Religious Leaders	Newcomber, Andrews and Hall: *Three Centuries of American Prose and Poetry* (Readings on Cotton Mather, Nathaniel Edwards, Michael Wigglesworth).	Wide and rapid reading. Individual conferences and reports.	Fosdick, H. E., *Twelve Tests of Character.* Van Dyke, H., *The Blue Flower, Angler's Luck.* (Selections). Crothers, S. McC., *Essays* (Selected). One biography of (or magazine reading about) list at right.	Phillips Brooks Rabbi Stephen S. Wise Edward Everett Hale Nathaniel Edwards Cotton Mather Increase Mather Samuel McChord Crothers Henry Van Dyke William Sunday S. Parkes Cadman Henry Ward Beecher Harry E. Fosdick Stanley Jones (*Christ of the Indian Road*). Eggleston, *The Circuit Rider.* Connor, R., *The Sky Pilot, Black Rock.*

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
D. Military and Naval Leaders	Olcott, F. J., *Good Stories for Great Birthdays* (John Paul Jones, George Washington). Parkman, M. R., *Fighters for Peace* (Pershing).	Model the scene of a great American military or naval encounter. Draw a picture of your conception of the scene in Appamatox Courthouse when Lee surrendered to Grant. Make a miniature stage setting of the surrender of Cornwallis.	Bryant, W. C., "Song of Marion's Men." Grant, U. S., "Memoirs" (Selections) Campbell, G., *Our City Chicago* (Selection on Ft. Dearborn Massacre). Simms, W. G., "The Swamp Fox." One biography from list at right and wide and rapid reading at discretion of teacher. Bradford, G., *Damaged Souls* (Benedict Arnold). Benet, S. St. V., *John Brown's Body* (Section on death of Stonewall Jackson).	George Washington Robert E. Lee Stephen Decatur Commodore Perry Admiral Peary Stonewall Jackson Andrew Jackson Phil Sheridan Benedict Arnold John J. Pershing Winfield Scott Marquis de La Fayette Baron de Kalb Kosiusko Anthony Wayne U. S. Grant Etc.
E. Explorers and Frontiersmen.	Whitman, W., "Pioneers, O Pioneers." Paxson, *When the West Is Gone* (Selections). White, S. E., "On Lying Awake at Night."	Construct a model of a covered wagon such as those used in the great westward movement. Write an imaginary diary of a trip over either the Oregon Trail, or the Santa Fe Trail, giving all the locations, etc. Write a diary of a pair of tourists on those same trails today, compare with the other diary.	Hawthorne, N., *Grandfather's Chair.* Byrd, Wm., *History of the Dividing Line.* One biography from: George Rogers Clark Daniel Boone Wm. Cody (Buffalo Bill) Father Marquette De La Salle Champlain De Soto William Byrd Richard Byrd John Smith Hendrik Hudson Etc.	Cooper, J. F., *Leatherstocking Tales* (any). Garland, H., *Son of the Middle Border.* Kingsley, C., *Westward Ho.* Irving, W., *Knickerbocker History of New York.* Wallace, Lew, *The Fair God.* Stockton, *Buccaneers and Pirates.* Wood, *Elizabethan Sea Dogs.* Thompson, *Alice of Old Vincennes.* Parkman, F., *Pioneers of France, The Old Regime.* Catherwood, *Lady of Fort St. John, The Story of Tonty.* Monroe, *Flamingo Feather.* Parker, G.,*Seats of the Mighty.*

UNIT III. AMERICAN TYPES

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
A. New England	Frost, R., "The Code," "Mending Wall," "Death of the Hired Man." Robinson, E. A., "Richard Corey," "John Gorham." Freeman, M. E. W., "New England Nun." Lowell, J. R., "The Courtin'" from *The Biglow Papers* (Second Series). Longfellow, H. W., "Tales from a Wayside Inn." Bryant, W. C., "Thanatopsis," "To A Waterfowl."	Short survey by teacher of New England Group of American authors and their influence. Dramatize the First Thanksgiving. Illustrate a map of New England with pictures clipped from magazines, of historic events. Sketch a plan of a New England cabin of the early days. Make a Journal of a trip from Boston to New York in 1930 after reading Knight's Journal.	Frost, R., *North of Boston* (selections). Robinson, E. A., "Miniver Cheevy," "The Master." Lowell, A., "Patterns," "Red Slippers." Bryant, W. C., "Forest Hymn," "Robert of Lincoln." Holmes, O. W., "Deacon's Masterpiece," "How the Old Horse Won the Bet." *New England Primer.* *Bay Psalm Book.*	Earle, A. M., *Child Life in Colonial Days.* Bok, E., *A Man From Maine.* Irving, W., "Legend of Sleepy Hollow." (School scene). Hawthorne, N., *The Scarlet Letter, House of Seven Gables, Mosses from an Old Manse, Blythedale Romance.* Lincoln, J., *Rugged Waters and other Cape Cod Stories.* Marquand, J. P., (Stories of New England clipper ships in back files of Saturday Evening Post.) Sinclair, U., *Boston.*

UNIT III. AMERICAN TYPES—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
B. Southern	Page, T. N., *Meh Lady, Red Rock.* Cobb, I. S., *Cobb's Bill o'Fare.* Lanier, S., "Song of the Chatahoochee," "Stirrup Cup," "Marshes of Glynn."	Write a letter from a Southern boy to his Northern cousin describing a party on the plantation and a reply from the Northern boy. Make up a model newspaper of the 1750-1800 period, with advertisements of run-away slaves, etc. Look up origin of "Dixie" and other southern songs and give floor talk on the group. Motion pictures: "Dixie (Yale U. Press Film Service, New Haven, Conn.) "Shenandoah" (Edited Pictures System, 71 W. 23 St. N. Y.) "Down in Old Richmond," (Evans Film Lab., 1476 Broadway, N. Y. C.) "Civil War Period," (Ford Ed. Films, Detroit, Mich.) "Abraham Lincoln" (First National Pictures, Inc., 383 Madison Ave., N. Y. C.).	Bradford, R., *Ol' Man Adam and His Chillun, David and the Philistine Boys.* Cable, G. W., *Old Creole Days.* Cobb, I. S., "The Belled Buzzard," *Old Judge Priest* (selections). Poe, E. A., "The Raven," "To Helen," "Annabel Lee," "The Cask of Amontillado," "The Murders in the Rue Morgue."	Page, T. N., *In Ole Virginny,* "The Burial of the Guns." Cable, G. W., *The Grandissimes, John March Southerner.* Bacheller, I., *Eben Holden.* Sinclair, U., *Manassas.* Hergesheimer, J., *Balisand.* Mitchell, S. W., *A Diplomatic Adventure.* Johnston, M., *To Have and to Hold, The Long Roll.* Churchill, W., *Richard Carvel.* Harris, J. C., *Gabriel Tolliver, On the Plantation, Free Joe.* Poe, E. A., *Fall of the House of Usher.*

UNIT III. AMERICAN TYPES—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
C. Middle West	Sandburg, C., "Chicago," "Prayers of Steel," "Fog," "Caboose Thoughts." Masters, E. L., *Spoon River Anthology* (selections). Suckow, R., *Odyssey of a Nice Girl* (selections) Lindsay, V., "Congo," "The Santa Fe Trail." Clemens, S. L., *Tom Sawyer, Life on the Mississippi.* Lardner, R., "Haircut" (from *Roundup*).	Visit to Stockyards and floor talks and written compositions on trip. News account of trip prepared for school paper. Visit to gas and coke-making plant—account of trip to be used for both this class and chemistry class. Pictogram of the by-products of oil, coal, grains, etc. Write a radio-logue visit to important spots of interest in Chicago. Visit Maxwell Street and contrast it in an oral or written talk, with medieval fairs.	Tarkington, B., Choice of: *Penrod, Seventeen, The Turmoil.* Lewis, S., *Main Street* (or) *Babbitt.* Field, E., *Poems* (selections). Sandburg, C., *Smoke and Steel, Chicago Poems, Slabs of the Sunburnt West* (selections). Preston, K., *Potshots from Pegasus* (selections). Morley, C. D., "The Century."	Lewis, S., *Main Street, Arrowsmith, Dodsworth.* Howells, W. D., *Stories of Ohio.* Anderson, S., *Tar, A Midwest Childhood.* Sinclair, U., *The Jungle, Oil* Norris, F., *The Pit.* Davis, J. J., *The Iron Puddler.* Addams, J., *The Spirit of Youth in the City Streets.* Suckow, R., *Odyssey of a Nice Girl, Iowa Interiors.* Cather, W., *O Pioneers, My Antonia.* Pollock, C., *The Fool.* Husband, J., *A Year in the Coal Mines.* Williams, W., *What's on the Worker's Mind.* Train, A.,*The Needle's Eye, Tutt and Mr. Tutt.* Tarkington, B., *The Gentleman from Indiana.* Lardner, R., *Roundup.* Sandburg, C., *Chicago Poems, Smoke and Steel, Slabs of the Sunburnt West, Good Morning America.* Smith and Lewis, *Chicago.* Campbell, E. F., *Our City Chicago.* Riley, J. W., *Poems..* King, B., *Poems.* Hecht, B., 1001 *Afternoons in Chicago.*

UNIT III. AMERICAN TYPES—Continued

Elements of Unit			*Supplementary Reading* *Reading for Some*
C. (Continued)			Churchill, W., *The Crossing, The Crisis.* Clemens, S. L., *Huck Finn, Tom Sawyer, Life on the Mississippi.* Garland, H., *A Son of the Middle Border, A Daughter of the Middle Border, Main Travelled Roads.* Beach, R., *The Iron Trail.* Bellamy, E., *Looking Backward.* Dreiser, T., *An American Tragedy, The Genius.* Hurst, F., *A President Is Born.*

UNIT III. AMERICAN TYPES—Continued

Elements of Unit	*Selections for Class Study*	*Enrichment Suggested Activities*	*Supplementary Reading*	
			Reading for All	*Reading for Some*
D. Far-West, Northwest and Southwest	Harte, B., "The Outcasts of Poker Flat," "The Heathen Chinese," "Tennessee's Partner." London, J., *Tales of the Fish Patrol* (*one*). Markham, E., "The Shoes of Happiness," (selections) Clemens, S. L., *The Jumpin' Frog of Calveras County.* Service, R. W., *Spell of the Yukon,* "Song of the Wage Slave," "Cremation of Sam McGee." Miller, J., "Crossing the Plains," "By the Pacific Ocean," "The Arctic Moon."	Map the chief routes taken by the forty-niners. Write to San Francisco Chamber of Commerce, Historical Society, etc., for material on early days in San Francisco. Draw up price list of common commodities in the boom days. Draw a diagram of the typical wagon-train organization used in crossing the plains. Records: "Out Where the West Begins," "Little Grey Home in the West," etc. Debate: "Resolved: That the West is more truly American than the East."	Harte, B., *The Luck of Roaring Camp.* Hovey, R., "Sea Gypsy." Roosevelt, T., *Winning the West* (selections).	Kyne, P. B., *Cappy Ricks.* London, J., *The Call of the Wild, White Fang, The Sea Wolf, The Cruise of the Snark.* Service, R. W., *The Spell of the Yukon, Songs of a Sourdough.* Jackson, H. H., *Ramona.* Moody, W. V., *The Great Divide.* Hough, E. *The Covered Wagon, Fifty-Four-Forty or Fight, The Cowboy.* Parkman, F., *The Oregon Trail.* Wister, O., *The Virginian.* Norris, F., *The Octopus.* Muir, J., *My Boyhood and Youth, Account of a Trip to Alaska.* White, S. E., *The Forty-Niners, Gold.* Meeker and Driggs, *Ox-team Days on the Oregon Trail.* Cooper, C. R., *The Last Frontier.* Roosevelt, T., *Winning the West.* French, *The Pioneer West* (collection). James, W., *Lone Cowboy, Smoky.* Sandburg, C., *The American Songbag* (Cowboy ballads).

College Entrance Requirements in English

(A Committee Report)

By E. L. MILLER, Chairman
Assistant Superintendent of Schools, Detroit, Michigan

A report on the progress made up to March, 1930, was presented to the Association last spring and was printed in the *North Central Association Quarterly* for September, 1930.

The document which follows is an attempt to present some of the suggestions, criticisms, and improvements which the committee is now ready to offer.

Although every proposition laid down by the committee was approved by substantial and most by overwhelming majorities, it is apparent that some of them needed to be expanded and explained, while others can be improved. The committee therefore suggests, as a basis for further discussion, the document which follows, asking everybody to remember that the subject under discussion is not primarily the teaching of English but the preparation of high school pupils for college, which may be and sometimes is another matter, although perhaps it should not be.

Aim

1. The high school course in English should be organized primarily with reference to basic personal and social needs.—Yes 1111; No 40.

This is a statement of the minimum aimed at. If more can be attained, let it be attempted. Not failure, but low aim, is crime.

Time

2. To the study of English should be devoted not less than five units in Grades 7-12, with additional electives in Grade 11 or Grade 12.—Yes 1107; No 34.

Six units would be better. Some schools find 6½ necessary. Less than five units, even for pupils gifted by nature or trained by the study of foreign languages, will not satisfy the colleges. Attempts to reduce the time allotted to English, when and if made, should be resisted.

Range

3. English comprises two subjects, language-composition and literature-reading.—Yes 1069; No 59.

Division of Composition from Literature

4. Though related, these involve radically different pedagogical methods. Hence in the course of study they should be separated. For the junior high school grades, units of work in literature and composition should be correlated in the same semester according to the block system. Moreover, literature may be used in all senior high school composition classes, effective expression being helped through the use of literary models and through constant insistence upon good, fluent, and accurate expression in all subject-matter classes, including those in literature. The separation of literature teaching from composition teaching makes possible the selection and use of the right materials.—Yes 993; No 112.

The separation suggested above is for administrative reasons. When composition and literature are mixed, the usual result is that neither is well-taught and sometimes that composition is not taught at all. Twelfth grade pupils have been found in such classes who have never written a composition. If a pupil can do good work in literature but is weak in composition, his deficiency in the latter is sometimes concealed by his skill in the former. Composition teaching is laborious; literature teaching is delightful; teachers have their share of human frailty; hence, in classes where literature

Note: See page 442 for price of reprints of this article.

and composition are mixed, composition does not always get its share of attention. Composition and literature belong on different levels. Pupils can read Shakespeare, but nobody can write like him. Hence the literary materials which are suitable for reading do not supply suitable models for composition. A mixed class is like a mixed train. It is slow. It is wasteful of time. It lacks that unity of purpose which is essential to success. A class in which composition and literature are segregated has in contrast the speed of a limited express.

Composition Aims

5. The aim of teaching oral and written expression is to give the learner the power to communicate his ideas to others. The subject-matter is the whole body of the pupil's ideas, emotions, and aspirations. Its medium is the English language. Expression touches life everywhere and touches literature whenever a pupil has an opinion to express either orally or in writing, because literature furnishes models of expression.—Yes 1144; No 6.

A major goal of English work is ability to express oneself easily and well in situations demanding speech or writing. As the school forms so large a part of the pupil's world and his achievement therein so largely conditions his self respect, the English teacher must first see that the pupil can write and speak creditably in ways called for by school situations. Instruction should also include such types of expression as the pupil now uses or is sure to use shortly in the world outside.

Patterns of class activity should thus be as varied as the situations demanding oral or written expression. Yet, over and over, we ask the child to do the same sorts of thing: answer questions, reproduce information, write a few stereotyped literary exercises.

Below are listed a number of functional centers of expression; i. e., types of actual situations calling for speaking or writing in which the pupil is sure to find himself in or out of school, and which suggest the diversity of activity patterns possible in the study of oral or written composition. The laboratory or project method will make possible most of the unusual items on these lists, either through class or committee conferences for planning activities, or during group work in carrying them out.

To save space, situations occurring in school are not repeated in the life-situation lists.

School Situations Demanding Oral Expression

Making announcements
Selling tickets to plays and selling subscriptions to school publications
Making talks for the charity drive or other patriotic and civic occasions
Making motions in a meeting
Taking part in discussion at a meeting
Speaking in favor of a candidate
Presiding at a meeting
Participating in a committee conference or being chairman of same
Making committee reports
Interviewing school officers to secure a favor
Asking advice of teacher or principal
Delivering messages
Telling in one or two sentences the gist of a book, chapter, or article read, or of a play or movie seen.
Telling the class of an interesting story one has read or heard
Giving reports of information collected through reading, interview, or experience
Explaining pictures shown to illustrate some point of interest
Explaining other types of exhibit
Conducting a group or class discussion
Exchanging opinion in same
Taking part in debates and informal arguments
Reading aloud poems, passages, or other material one wishes to quote or share enjoyment of
Reading aloud one's own papers
Reading aloud the work of one's classmates
Offering friendly suggestions for improving classmates' work
Explaining class work and school to visitors

Life Situations Demanding Oral Expression

Giving instructions as to how to do or make something
Explaining games and directing them
Directing strangers to places, etc.
Giving orders to subordinates
Giving business orders for groceries, drugs, taxis, etc.
Making a sale
Teaching a class, as at Sunday school
Interviewing persons to secure information
Arguing disputed questions, particularly political, social, or economic
Recommending book, magazine, article, play, or movie
Making speeches for special occasions
Social conversation
Reporting facts or news clearly
Discussing hobbies, recreations, or the news of the day
Describing and sizing up people
Answering the telephone
Answering the door bell
Making social calls
Introducing and being introduced
Offering congratulations, sympathy, or apologies
Telling anecdotes and jokes
Telling stories to little children

School Situations Demanding Written Expression

Writing notices and announcements
Preparing publicity for school affairs
Wording posters
Writing slogans
Getting up a program
Writing up committee reports
Writing minutes of meetings
Editing a school or class paper
Writing editorials, letters, jokes, stories, or articles for same
Getting up bulletin board displays
Investigating, gathering, organizing, and summarizing facts, including such writing as taking itemized notes on separate cards; making outlines for talks and papers; and writing papers based on such research
Making outlines in parallel columns to show related information
Making booklets, notebooks, and anthologies
Writing informatory reports
Writing reports of opinion
Making out unit assignments for class or group
Drawing up review questions
Phrasing test and examination questions
Taking written examinations
Dramatizing stories
Dramatizing dialog for puppet plays
Planning pageants

Life Situations Demanding Written Expression

Formulating rules
Writing contracts or agreements
Preparing instructions for subordinates
Writing business orders and sales letters
Making a budget
Making notes and memoranda
Making laundry and shopping lists, etc.
Writing telegrams
Writing letters of narration and gossip
Reporting lectures, concerts, plays, movies, etc., in letters
Writing invitations, acceptances, or regrets
Writing letters of thanks, congratulation, or condolence
Composing original rhymes for special occasions

The functional idea in composition involves two things: first, the definition of the course in terms of *things to be done*; and, second, the organization of instructoion around expressional activities common to social experience. The first item requires elimination (or radical subordination) of abstract, theoretical, or purely academic subject matter in favor of activities which are immediately purposeful. The second item goes further: it requires a justification of composition activities in the light of the well-established doctrine of social need. "Where does this activity emerge in the pupil's present experience?" and "Where is it likely to emerge in the pupil's future experience?" are questions that must be continually asked. In other words, if the training in composition is to prepare pupils to meet real situations, we must know what those situations are likely to

be and we must anticipate them by using the same or similar situations as challenges to pupil effort.

Even a brief analysis of everyday experience will reveal the character of the list of functional activities which should be the basis of a course in composition. A more extended analysis will refine the list and give us confidence to proceed. Such inventories of expressional needs give us numerous specific activities which fall easily into certain functional categories: letter-writing, conversation, group discussion, making a talk, reporting experiences (direct or indirect), giving directions or explanations, telling a story, keeping personal memoranda. These are the functional centers of English expression. With the numerous situations for instruction and practice which they immediately suggest, they offer an alluring opportunity to the teacher of composition.

It is important to note that the functional idea of composition considers immediate needs as well as future needs. Thus composition training is projected into every department of school life. Correlation with other subjects becomes one method of making the course functional. Whatever pupils think, talk, and write about in connection with their various school subjects is natural content for composition. But the English activities of the classroom, though sometimes artificially evoked, will not differ greatly from the functional types of expression already mentioned. As the school becomes more and more an integrated social unit, the activities involved become the activities of out-of-school experience.

English in All Subjects

6. Since it touches life everywhere, composition can be taught successfully only through the interest of English teachers in the writing and speaking of pupils in all subjects and through the supervision of all teachers in the oral and written reports of their own pupils. —Yes. 1117; No. 24.

English is a set of habits; to get anywhere in good English, students must get everywhere in good English. It is not practical to expect teachers of other subjects to expend the same meticulous care upon expression that the teachers of English do. But it is clearly possible to attain a degree of attention somewhere between meticulous care and complete neglect, and this degree ought not to depend upon the individual teacher of other subjects but upon some common agreement and effort. There are, as has been intimated, degrees of attention, and teachers of other subjects might well be encouraged to begin with a slight measure of co-operation and to increase their help as results are demonstrated to be worth while. Some suggestions gleaned from effective practice follow.

1. Stress excellent work in various subjects by posting the best papers conspicuously on bulletins or in display cases. Excellent work in any subject must involve reasonable handling of content and presentable form. (Praising the good, rather than condemning the bad, is probably the more fruitful practice throughout.)

2. Students may be allowed or encouraged to submit excellent papers from other subjects, either in lieu of some written project in English or for additional credit.

3. Schools may set up very definite minimum standards for oral and written work in all subjects and make a co-operative effort to maintain them. A specimen plan follows:

Plan for Maintaining School Standards in English

(A) Notice to teachers (over principal's signature)

As an aid to good work it is clearly necessary for teachers of all subjects to co-operate in maintaining reasonable standards in speaking and writing. The card forms which accompany this letter (c, below) furnish convenient means for you to report students for particular help. Will you be good enough to fill them out and drop them into the mail box of the English department head or chairman, as occasion arises?

Improving English in Use

It is clear that the faculty should arrive at a simple list of the decencies of

expression to be maintained everywhere. By way of suggestion, a list is proposed for discussion at the next teachers' meeting, from which school standards should emerge.

(b) Statement of the Decencies of English for All Subjects

ORAL WORK

1. Topical recitations, calling for thought and language units of effective length and organization, shall be encouraged. As far as it is practical, students shall take the floor for such work, and stand erect and free, facing the group.

2. All work shall be audible and distinct.

3. Sentence units and structural units shall be unmistakable. Thinking should not be obscured by grunts, nor by "why," "well," "and-a," "ah," etc. Please war upon the "and" between sentences.

4. The elimination of egregious and common errors is a school matter. List common errors for the English department's information, and give what time you can yourself to hunting them down relentlessly.

WRITTEN WORK

1. Written work shall include material vital to the subject, exclude irrelevant material, and indicate some form of organization easily grasped by the reader.

2. Thought units within the whole work shall be organized to be easily distinguished in the form of paragraphs, and transitions shall be managed so as to be clearly followed.

3. The use of incomplete sentences, or of *interminable* straggling compound sentences is an evidence of slovenly thinking which should be corrected in any subject.

4. Egregious errors or slovenliness in grammar, spelling, or format (margins, legibility, endorsements, etc.) should be discouraged in all subjects.

Improving English in Use

(c) Card form for report to English department of students needing help, submitted by teachers of other subjects.

..... needs attention in English as checked:

ORAL
- Total organization
- Paragraph organization
- Sentence units
- Vocabulary
- Grammar
- Distinctness
- Ease and practice in speaking
- Other items (write in)

WRITTEN
- Total organization
- Paragraph organization
- Sentence organization
  - Fragmentary sentences
  - Straggling sentences
- Grammar
  - Vague pronouns
  - Agreement of subject and predicate
- Vocabulary
- Form
- Margins
- Handwriting
- Title
- Punctuation
- Capitals
- Spelling: list of common errors

Further comment:

I am ..... sending herewith illustrative papers from my course.

I am not .....

Signed..... .....

(Teacher) (Course)

Such reports as C above may be passed on to the English teacher concerned by the English chairman, or by the high school clerk. It might be quite as stimulating to allow space for reporting particularly good work in expression from other classes, and to have English teachers post such favorable reports upon their own bulletin boards.

Students who fall conspicuously below par in the decencies of English in their work in other courses may require more help than can be given in the regular English class. Some schools group these students into remedial classes and assign part or all of an English teacher's time to ironing out their difficulties.

Composition Processes

7. Language-composition includes several subjects, among them being oral expression, grammar, rhetoric, written

expression (which includes spelling, punctuation, and capitalization). Both written and oral composition are best taught by the following cycle of processes: (1) Choice of a subject; (2) gathering of material; (3) organization of material; (4) oral composition. If the composition is to be written, the following additional processes are recommended: (5) Written composition; (6) Revision (which involves grammar and rhetoric); and (7) publication.—Yes 1033; No 36.

Language-composition is a comprehensive term including several subjects, among them being oral expression, grammar, rhetoric, and written expression (which includes such formal elements as spelling, punctuation, and capitalization). Both oral and written composition follow substantially the same steps in organization, for both are addressed to an audience. Aristotle's convenient division of rhetoric as an art into (1) the speaker, (2) the audience, (3) the speech (the bringing of the speaker to bear on his audience), is helpful to the teacher of composition. The subject must include the speaker; it is his subject only if it interests and arouses him, impelling him to expression. He must adapt his subject and himself to his audience; what is his must become theirs. "The audience furnishes the point of view," says Aristotle.

Composition is a matter of ideas, of thinking; there is the desire to express in orderly sequence the material which so interests the speaker or writer. Interest in content outweighs any interest in form. The mind centers upon subject matter. The following cycle of processes may be profitably followed: (1) Choice and limitation of subject matter in view of audience-consciousness and the available time. (2) Gathering of material. The writer is guided in this process by the limitation of his subject and by an understanding of the interests and the background of his audience. (3) Organization of material. Details must be arranged in harmony with the purpose of the composition, whether it be to entertain, to make information clear, or to convince. (4) Informal group discussion centering on the chosen material and its organization. The teacher may lead and stimulate vigorous critical analysis and encourage pupil self-appraisal on points one, two, and three. The strategic time for the teacher to offer help is during the period when the composition is in the making, and before it has "jelled" and taken final form. (5) Oral composition. This is the finished product in oral expression, to which the other four steps lead.

If the composition is to be written the following additional processes are recommended: (6) first or rough draft of the written composition. This should be prepared with the entire interest on subject matter. It is for the eye of the author only; no others should ever read it. In his absorption in the creative process, he may misspell, omit punctuation, abbreviate, or forget the niceties of grammar. And he should. Later his material can be dressed in conventional form. (7) Pupil self-appraisal. This should come several hours after the rough draft has been written and allowed to "cool." (8) Revision. Interest in form comes only after all these preliminaries in thinking and organization have been completed. The writer should rigorously "proofread" his work, attending to such matters as grammatical agreement, spelling, and punctuation. The first seven processes are effectively carried on in the composition laboratory under the leadership of the teacher. Revision may conveniently be homework. (9) Presentation to the intended audience. While occasionally a student may write only for himself with no audience in mind, most school writing is for *use*. It is created for a definite purpose. The teacher must provide an audience. Compositions may be exchanged and read, the reader addressing his attention to material and organization, (never to technical matters of form), and writing and informal and friendly comment on the paper. The group may be divided into committees of five or six, each small group serving as audience to each composition. Later, selected compositions

may be read to the entire group or club; it may be posted on the bulletin board or printed in the class or school publication. Students are likely to write with more interest if they know that their themes are shared within the group.

Literature Aims

8. The aim of literature-reading instruction is to develop in pupils the power to understand, feel, and appreciate the ideas, emotions, and aspirations of others. In other words, it is to build up the power and habit of sharing experiences which others have had. As the vehicle by which thought and feeling about subject matter are transferred from mind to mind, it touches all content subjects.—Yes 1150; No 19.

What is it that reading does for us? In general, the answer is that it widens, deepens, and enriches our lives. It enables us to escape from the narrow boundaries of our own experiences. The average person lives only three score years and ten, and is restricted in his movements to a circle with a diameter of a few hundred miles; at most he is confined to mother earth plus the few thousand feet that the airship can attain. With books he can go back in thought millions of years to the time when this world was a fluid haze of light, or forward to the point when Time meets Eternity. He can put a girdle round the earth in 40 minutes, or can travel to the outmost verge of space among the stars. More important still, he can share the thoughts, hopes, emotions, and adventures of others. Like Odysseus, he can outwit one-eyed and one-idea-ed giants. He can share Robinson Crusoe's thrill at the sight of Friday's footprint. He can lead armies with Napoleon. He can enter Lincoln's log cabin.

Contrast the infinite riches which books bring to us with a dog's poverty of experience. The dog of today probably knows as little as the dog of the caveman. Any schoolboy today, through the medium of books, may know things that Plato could not know and have experience beyond the reach of Shakespeare.

Scope of Literature Study

9. Like composition, literature includes several subjects, among them being reading (both silent and oral), oral and written discussion, declamation, play production, and the history of literature. It may also include some study of the elements of style, of literary types, of the use of the library, and of words.—Yes 1087; No 5.

Results of Literature Study

10 The study of literature should create in pupils a desire to read and the habit of reading. It should be conducted so as to form in the learner well-defined tastes with regard to the type and the quality of his reading and so as to enable him independently to select books for his avocational or vocational reading. This means the provision in the classroom of many books of many types and the abandonment of that type of course of study which tries to satisfy these aims by the use of a very limited number of books. The study of literature in Grades 7-12, inclusive, may well be constructed to include various patterns (functional patterns for the junior high school; types of literature patterns and historical patterns for the senior high school).—Yes 1162; No 2.

If this seems too ambitious except for the strong student, it is to be borne in mind that only the strong student should go to college. Some means of segregating weak students from strong should be found, either by classification into fast and slow sections, by some form of individualized study, or by segregation on the basis of destination.

Individualization

11. The individualization of instruction is of great importance. For example, children whose language habits are natively correct may be excused from drill lessons in grammar and other drill subjects. On the literature side this principle should operate so as greatly to increase the amount of independent reading. The extension of independent library reading in all subjects is to be encouraged.—Yes 1034; No 74.

Individualized study can be attained in small as well as in large high schools. In general the method is to divide the material into units or projects, to outline these projects, to have them mimeographed, and to permit each pupil, with the aid of these mimeographed lessons (and of course the teacher), to proceed at his own rate rate of speed. There is nothing new or revolutionary about this. Quintilian in his *Institutes of Oratory* says: "It is generally, and not without reason, regarded as an excellent trait in a master to observe accurately the differences of ability in those whom he has undertaken to instruct, and to ascertain in what direction the nature of each particularly inclines him."

Skills at Grade VII

12. At the end of Grade VI pupils should be able: (1) to express clearly and consecutively, either in speech or writing, ideas which are familiar; (2) To avoid gross grammatical errors; (3) To compose and mail a letter; (4) To spell their own vocabulary; (5) To read silently and after one reading reproduce the substance of a simple story, news item, or letter; (6) To read aloud readily and intelligently simple news items, lessons from textbooks, or literature of such difficulty as "The Ride of Paul Revere" or Dickens's "Christmas Carol"; (7) To quote accurately and understandingly several short poems. —Yes 1027; No 80.

To this statement it is objected that even some college graduates do not reach the standard set here for Grade VII. The reader who agrees with this objection is reminded that this report deals only with those strong pupils who are on their way to college and is also referred to the next paragraph.

Flexible Courses

13. Building upon this foundation (see Paragraph 12), when it exists, and upon the actual attainments of pupils when it does not exist, there should be organized in each high school a course in English to meet the aims and principles set forth above. The details of such a course must vary to satisfy the requirements of different communities and of pupils of different grades of intelligence. A highly condensed outline of such a course follows:—Yes 1065; No 49.

Grade VII

A—Composition

The materials for oral and written expression in Grade VII should be derived from the children's play; their work in school and out; their direct observation of processes, scenes, objects and occupations; the books they read; and their imagination. The nature and spirit of written work most appropriate for this grade may be found in informal letter-writing and other functional forms of expression which draw their content from the sources named earlier in this paragraph. Formal compositions and themes assigned as such should be discouraged.—Yes 1079; No 10.

B—Minimum Essentials

To secure correctness there must be attained a mastery of certain fundamentals in the technique of language. In Grade VII there should be investigation of the language habits of all pupils so that instruction may begin at the proper level. The aim should be to master these topics: recognition of the parts of speech by function; subject and predicate, object, predicate noun and adjective; inflection of nouns and personal pronouns for number and case; the idea of tense; clauses and phrases as groups of words with the functions of single words; and necessary punctuation. Words used in all school subjects should be spelled correctly.—Yes 1052; No 27.

C—Reading

(1) For the literature work of the junior high school grades, the general principle of organization should be some systematic interpretation of happy and successful living.

(2) For the general reading for this and the following grades there should be provided a wide range of books, papers, and magazines dealing with wholesome living, worthy home membership,

vocations, citizenship, the worthy use of leisure, and right conduct.

(3) Poetry, fiction, science, art, ethics, civics, sociology, history, biography, and travel should be included, both new and classic, and can be included in the functional arrangement suggested above.

For class work in Grade VII some of the shorter poems of Longfellow and Whittier, Miles Standish, Evangeline, The Great Stone Face, Rip Van Winkle, The Legend of Sleepy Hollow, Treasure Island, The Gold Bug, Stories of King Arthur, and the Jungle Books are of about the right grade of difficulty.—Yes 1090; No 20.

(4) Periodical literature—both newspapers and magazines—may be used to advantage in the classroom to enrich the teaching of English.

(5) Reputable newspapers may be used for the study of *editorials,* both content and formation; for the study of *important speeches* made by the president, by diplomats, by State officials, etc.; for the discussion of community problems which may be turned into composition projects.

(6) Such periodicals as *The Atlantic, Harper's, Scribner's, World's Work, The Bookman, The Forum, The Golden Book,* etc., have from time to time excellent material through which an approach may be made to authors of another century. Articles too, can be found which will help English to become a less isolated subject. Scientific articles by such authors as William Beebe, Bernard Jaffe, Paul de Kruif; historical and political surveys; essays dealing with modern behaviorism and social problems by James Truslow Adams, Agnes Repplier, Mary Borden, Katherine Fullerton, Gerould; economic problems; first hand information of new discoveries; excellent stories and delightful poetry by twentieth century writers, ought to be utilized.

(7) Through the periodicals it is possible to discover the individual tastes of students, and to encourage live interests. Reading habits and standards of taste are bound to improve if this material is used.

(8) Two helpful guides to periodical literature, educationally sound, and focusing on material suitable for high school, are *The Magazine World* (a monthly) and *Current Literature*—a weekly leaflet. Through the publishers of these study sheets, the monthly magazines themselves may be secured for classroom use at low cost.

(9) In Grade VII the following modern books are recommended:

I. Science: Mukerji, Dhan Gopal: *Ghond the Hunter, Gay Neck.* Salten, Felix: *Bambi.* Schultz, James W.: *Bird Woman.* Sharp, Dallas Lore: *Boy's Life of John Burroughs, Beyond the Pasture Bars, Face of the Fields.* II. History: Crew, Helen Coale: *The Trojan Boy.* Davis, William Stearns: *A Friend of Caesar, A Victor of Salamis.* Kipling, Rudyard: *Puck of Pook's Hill, Rewards and Fairies.* III. Stories and *biog:* Austin, Mary: *The Children Sing in the Far West.* Duncan, Norman: *Adventures of Billy Topsail;* Garland, Hamlin: *Boy Life in the Prairies.* Kipling: *Captains Courageous.* Lagerlof: *Wonderful Adventures of Nils.* Terhune, Albert Payson: *Lad, a Dog, Luck of the Laird.* Walpole, Hugh: *Jeremy and Hamlet.* IV. Poetry Collections: Carhart & McGhee: *Magic Casements.* Untermeyer, L.: *This Singing World.* Masefield, John: *Salt Water Ballads.* V. Collections: Hagedorn, Herman: *Book of Courage.* Lynch, Virginia: *Magic Spear.*

D—Individual Needs.

In line with the foregoing paragraphs, in Grades VII, VIII, and IX there must be recognition of the wide range of differences in language attainment found in any group of pupils. This range sometimes extends from Grade 4 to Grade 12. By the use of objective measurements, weaknesses and proficiencies may be discovered, the needs of individuals diagnosed, and suitable materials of instruction determined. Instruction in language control must increasingly turn away from uniform class procedure toward differentiation and adaptation to individual needs.—Yes 1000; No 14.

Grade VIII

A—Composition

In addition to the composition materials suggested for Grade VII it is advisable, in Grade VIII, to use civic questions, imaginary journeys, admirable characters in life or books, questions of school life, trips. These may be treated in expositions, narratives, descriptions, conversations, discussions, letters. Particular attention should be given, in this and all subsequent grades, to the art of making well-organized, fluent, and correct recitations and reports in other subjects. Progress should be made in the planning of themes, the manipulation of sentences, spelling, and punctuation.—Yes 1089; No 1.

B—Grammar

The study of grammar in Grade VIII should add a mastery of the essential elements of the sentence (subject, predicate, modifiers, connectives), of clauses as parts of compound and complex sentences, of common and proper nouns, of classes of pronouns, of the person, number and voice of verbs, of the classification and comparison of adjectives and adverbs, of the choice of prepositions, of conjunctions as co-ordinating and subordinating.—Yes 1058; No 20.

C—Reading

As material for class work in literature in Grade VIII, some of the short poems of Holmes, Lanier, Riley, and Field, Whittier's Snowbound, Scott's Lay of the Last Minstrel, Macaulay's Horatius, Longfellow's Tales of a Wayside Inn, Norse Myths, Cooper's Novels, Stevenson's Kidnapped, Kipling's Captains Courageous, Kate Douglas Wiggin's Rebecca of Sunnybrook Farm, A Midsummer Night's Dream, The Tempest, Franklin's Autobiography, and Warner's In the Wilderness offer a reasonable range. In the junior high school, this and similar material is to be organized and systematized about units of daily life.—Yes 1024; No 36.

If more recent material is desired, the following books are recommended: I. HEROES AND HERO WORSHIP (Story, biography, history)—Amundsen, Roald: *The First Crossing of the Polar Sea.* Byrd, R. E.: *Skyward; Little America.* Doyle, A. Conan: *White Company.* Finger, Charles: *Courageous Companions.* Garland, H.: *Prairie Song and Western Story.* Grenfell, W.: *Tales of the Labrador.* Hawes, Chas. B.: *The Dark Frigate.* Heyliger, William: *Spirit of the Leader.* Morrow, Honore Willsie: *On to Oregon; We Must March.* Turley, Chas.: *The Voyages of Captain Scott,* introduced by Sir James Barrie. White, S. E.: *Daniel Boone: Wilderness Scout.* Wilson, Elijah N.: *White Indian Boy.* McSkimmon & Chiesa—*This Interlocking World* (introducing the reader to other lands and peoples, encouraging international good will.) II. PLAYS—Materlinck, M.: *Blue Bird.* Milne, A. A.: *Toad of Toad Hall; The Ivory Door.* III. POETRY—Noyes, Alfred: *Forty Singing Seamen.* Untermeyer: *Poems of Yesterday and Today.*

Grade IX

A—Composition

Particular vocations and current events may be added in Grade IX to the composition materials. The most available means of obtaining clearness, force, and interest in composition should be presented informally; the chief features of explanation and narrative should be learned inductively; much drill should be devoted to social and business letters, spelling, word structure, and punctuation. At the end of Grade IX a pupil should be able to avoid any ordinary error in grammar, to improve expression by varying grammatical structure, and to write good social and business letters.—Yes 1106; No 14.

B—Grammar

Such grammar should be taught as is necessary for use or to supplement previous deficiencies.—Yes 951; No 36.

C—Reading

Among the poems suitable for Grade IX are Browning's Hervé Riel, Lowell's The Courtin', Scott's Lady of the Lake, Shelley's To a Skylark, Emerson's Concord Hymn, Keats's On First Looking into Chapman's Homer, Whitman's Cap-

tain, My Captain, and Poe's Helen. Poe's Purloined Letter, Hawthorne's Ambitious Guest, O. Henry's Chaparral Prince, Davis's Gallegher, and Hale's Man Without a Country are types of stories suitable for this grade. Ivanhoe, Quentin Durward, and Kim are desirable novels. Julius Caesar and The Merchant of Venice are the best plays; Irving's Christmas Sketches are useful. Palmer's Odyssey and Bryant's Iliad (in part), with related myths, are well-nigh indispensable. This material ought not to be spread miscellaneously before pupils, but ought to be functionally grouped according to its spirit and message.—Yes 910; No 68.

The foregoing list is not inclusive but suggestive. It has been made purposely to include selections of a wide range of difficulty, this being done for the benefit of pupils of varying ability.

Among the modern books suitable for Grade IX are: I. Reading Material of a General Nature—Cohen, Joseph G.: *Modern Pioneers.* Ferris & Moore: *Girls Who Did.* Finger, Chas.: *David Livingstone.* Gibson, Kath.: *Goldsmith of Florence.* Hudson, W. W.: *Far Away and Long Ago.* Lagerlof, S.: *Marbacka.* Lindbergh, C. A.: *We.* Newbolt, Henry J.: *Book of the Long Trail.* Scudder, Janet: *Modeling My Life.* Steffansson, V.: *Life Among the Eskimos.* Sugimoto, Etsu Inagati: *Daughter of the Samurai.* II. Fiction—Atkinson, Eleanor: *Johnny Appleseed.* Bojer, Johan: *The Emigrants.* Byrne, Don: *Messer Marco Polo.* Hawes, C. B.: *Great Guest.* Kelley, Eric P.: *Blacksmith of Vilno.* Masefield, John: *Lost Endeavor.* Sabatini, R.: *Captain Blood.* Stratton, Clarence: *Robert the Round Head.* White, S. E.: *Blazed Trail.* III. Plays—Thomas: *Atlantic Book of Junior H. S. plays.* IV. Poetry—Auslander & Hill: *The Wingéd Horse.*

Grade X

A—Composition

To the work in composition Grade X brings a wide range of new school studies, social relations, and knowledge of the world's work and play. In the field of rhetoric it is the time to study the building of paragraphs, sentence manipulation (particularly clearness through connectives, the correct placing of modifiers, and unmistakable reference), conciseness, wordbuilding. Spelling and punctuation must not be forgotten. To the forms already used may now be added telegrams, news stories, editorials, advertisements, and the dramatization of situations. The products should be greater clearness and force in speech and writing, increased power of persuasion, ability to handle the simple problems of business correspondence, and the habit of using the newspaper rightly.—Yes 1121; No 5.

Among the more recent books suitable for Grade 10 are these: I. Fiction—Barrie, J. M.: *Sentimental Tommy.* Cather, Willa: *Song of the Lark.* De la Mare, W.: *Memoirs of a Midget.* Hemon, Louis: *Maria Chapdelaine* (trans. by W. H. Blake). Maurois, Andre: *Silence of Colonel Bramble.* Tarkington, Booth: *Gentleman from Indiana; Monsieur Beaucaire.* II. Other Prose—Antin, Mary—*Promised Land.* Brown, H. C.: *Grandma Brown's Hundred Years.* Canfield, Dorothy: *Home Fires in France.* Garland, Hamlin: *Back Trails of the Middle Border; Roadside Meetings.* Parker. C.: *An American Idyll.* Repplier, Agnes: *Père Marguette* (Priest Pioneer, Adventurer). Shaw, Anna Howard: *Story of a Pioneer.* Skeyhill: *Corporal York,* the Last of the Long Hunters. Tomlinson, H. M.: *The Sea and the Jungle.* Wilkinson, Marg.: *Dingbat of Arcady.* III. Plays—Barrie, Sir James: *Quality Street; Admirable Crichton; A Kiss for Cinderella.* Hamilton, Cosmo: *Pickwick* (After Dickens's *Pickwick Papers*). Miller, Ashley: *Mr. Scrooge: A Dream Fantasy* (after Dickens's Christmas Carol). Noyes, Alfred: *Sherwood.* IV. Poems—*The Poems of Emily Dickinson,* Sara Teasdale. Carl Sandburg's *Early Moon.* Vachel Lindsay's *Every Soul a Circus.* Also Untermeyer's *Modern Poetry—British and American,* as a collection. Possibly, Auslander and Hill's *Wingéd Horse* may be used in both *9 and 10.*

B—Reading

In the senior high school, literature should be studied from the literary and the historical points of view. In the tenth grade it is wise to consider American History as interpreted through American Literature. In case it seems advisable not to study American Literature in this grade, appropriate material will be found in the following: (1) Poems—Lowell's Vision of Sir Launfal, Tennyson's Enoch Arden and Ulysses, Coleridge's Ancient Mariner, Burns' Bannockburn, and Arnold's Sohrab and Rustum; (2) Plays—Shakespeare's As You Like It, Drinkwater's Abraham Lincoln; (3) Fiction—Blackmore's Lorna Doone, George Elliot's Silas Marner, Dickens's Tale of Two Cities, Lew Wallace's Ben Hur; (4) Other prose—Irving's Alhambra, Stevenson's Travels with a Donkey, Burroughs' Essays, and Lincoln's Speeches.—Yes 1063; No 25.

Grade XI

A—Composition

In Grade XI the work in composition should become more definitely technical. The secrets of literary effect should be studied. Outlines, themes, debates, parliamentary usage, related letters, short articles, editorials, and descriptions may be produced. Particular emphasis must be placed on wealth of material, effective organization, and correct technique. —Yes 1086; No 22.

B—Literature

It is probably best to make this year a study of English literature arranged chronologically, beginning with the Anglo-Saxon Period. Among the best books for this study are the Idylls of the King, Macbeth, Hamlet, Milton's Minor Poems, Wordworth's Shorter Poems, Macaulay's Essays, and the novels of Walter Scott, Jane Austen, Dickens, Thackeray, and George Eliot. Provision should also be made for the study of speeches on citizenship and of the best modern prose and verse.—Yes 924; No 141.

The following more recent books are probably as good for Grade XI as any. This list, and that for Grade XII, must, however, be regarded as only tentative. I. FICTION, BIOGRAPHY, GENERAL—Buchan, John: *Midwinter.* Byrd: *Little America.* Byrne, Don: *Last Crusade; Field of Honor.* Davis, W. S.: *The Whirlwind; Life in Mediaeval England.* Eaton, Jeannette: *A Daughter of the Seine.* Finger, Charles: *Hakluyt's Voyages.* Hardy, Thomas: *Under the Greenwood Tree.* Masefield, John: *Gallipoli.* Ronn, E. H.: *Homeland of English Authors.* Sabatini, R.: *Scaramouche.* Stefanson, V.: *The Friendly Arctic.* II. CITIZENSHIP—*Letters of Walter Hines Page; Letters of James Whitcomb Riley,* Ed. by William Lyon Phelps. Taft and Roosevelt: *The Intimates.* III. POETRY—Hill, Frank E.: *The Canterbury Tales.* Housman, A. E.: *A. Shropshire Lad.* Masefield: *Midsummer Night.* Noyes, Alfred: *Tales of the Mermaid Tavern.* Van Doren: *Junior Anthology of World Poetry.* IV. PLAYS—Bennett, Arnold: *Great Adventure* (from Buried Alive). Bennett & Knoblock: *Milestones.* Fitch, Clyde: *Beau Brummel.* Galsworthy: *Loyalties; Skin Game.* Guitry, S.: *Deburau.* Knoblock: *My Lady's Dress.* Millay: *The King's Henchman.* Milne, A. A.: *Mr. Pine Passes By.* Parker, L. N.: *Pomander Walk; Disraeli.* Rostand: *Cyrano de Bergerac* (trans. Brian Hooker).

Grade XII

A—Composition

In Grade XII pupils who have done with credit the work outlined for previous grades should be permitted to follow up their special interests in order to prepare them for their vocations. Among such special interests are newspaper work, commercial correspondence, advertising, debating, the short story, verse writing, dramatization, scientific description. Pupils who show marked deficiency in the work outlined for previous years, on the other hand, should be given individual attention or grouped in drill classes according to their needs.—Yes 1052; No 34.

Twelfth grade pupils may read to advantage some or all of the following modern books. I. NOVEL—Emphasis on *American History*—Boyd, T.: *Drums;*

Marching On; Mad Anthony Wayne. Cather, W.: *Death Comes for the Archbishop; My Antonia.* Chapman, Maristan: *Home Place; Happy Mountain.* Hergesheimer, J.: *Java Head; Balisand.* Heywood, Dubose: *Mamba's Daughters.* Johnston, M.: *Prisoners of Hope.* Lovelace: *Early Candlelight.* Roberts, E. M.: *Great Meadow.* Rolvaag, O. E.: *Giants of the Earth.* Sergeant, E. S.: *Short as Any Dream.* Wharton, Edith: *Ethan Frome.* II. Essay, Biography, Literature of a General Nature—Adams, J. T.: *The Adams Family.* Beebe, William: *Jungle Peace; Edge of the Jungle.* Bent, Silas: *Men and Machines.* De Kruif, Paul: *Hunger Fighters.* Hergesheimer, Jos.: *Swords and Roses; Quiet Cities.* Jaffe, Bernard—*Crucibles.* Maurois, Andre: *Ariel; Disraeli.* Nicholson, M.—*The Conway Letters.* Pupin, Michael: *From Immigrant to Inventor.* Shelton, Jane De Forest: *Salt Box House.* Strachey, Lytton: *Eminent Victorians.* Van Doren, Dorothy: *The Lost Art.* Dimnet, Abbe E.: *The Art of Thinking.*

III. Essays—informal. A. Outstanding essays by individuals such as: Barrie, J. M.: *Courage.* Coffin, Robert P. T.: *Cottages and Crowns.* Erskine, John: *Moral Obligation to be Intelligent.* Price, Lucien: *Wingéd Sandals.* Reese, Lizette: *Victorian Village.* B. Acquaintanceship in general with Christopher Morley, Frances Lester Warner, Charles S. Brooks, Samuel Crothers, Stephen Leacock, C. E. Montague, Mary Ellen Chase, etc. IV. Short Stories—Arvin, Newton ed.: *The Heart of Hawthorne's Journals* (Beautiful source book for plots). Chesterton, G. K.: *Wisdom of Father Brown.* Cobb, Irvin: *Old Judge Priest.* Conrad, Joseph: *Youth; Heart of Darkness; End of the Tether; Lord Jim.* Deland, Marg.: *Old Chester Tales.* Galsworthy, John: *Caravan.* Garland, Hamlin: *Main Traveled Roads.* Grenfell, W.: *Tales of the Labrador.* Hudson, W. H.: *Tales of the Pampas.* Kipling, Rudyard: *The Day's Work,* etc., any or all. Mansfield, Kath.: *Garden Party.* Train, Arthur: *Tutt & Mr. Tutt.* V. Plays — Balderson, J.: *Berkeley Square.* Belasco, David: *Return of Peter Grime.* Gale, Zona: *Miss Lulu Bett.* Lady Gregory: *Seven Short Plays.* Molnar, F.: *The Swan.* O'Neill, Eugene: *Beyond the Horizon; Emperor Jones.* Shaw, G. B.: *Androcles and the Lion.* Vane, S.: *Outward Bound.* VI. Poetry — Frost, R.: *West Running Brook; North of Boston.*

B—Literature

The twelfth grade may wisely be given over to electives in literature as suggested below. However, if one basic course is desired, a study of world literature arranged by types and including selections from many languages in translations would be wise. There may also be a number of courses to be elected by pupils according to their aptitudes. Among these might be the drama, the novel, short stories, speeches, essays, poetry, or the work of a single author.—Yes 954; No 111.

Three possible organizations, indeed, may be suggested for the literature work in Grades X, XI, and XII. First, Grade X may be devoted to a chronological survey of American and Grade XI or XII to a chronological suvrey of English literature. Some may prefer to put English literature before American and some to defer the study of the latter until the upper grades. To such variations there is no vital objection.

Curriculum Enrichment

14. To attain the ends outlined above, encouragement should be given to school papers, dramatics, debating, public speaking, literary clubs, and such other agencies as supply proper motivation to students.—Yes 1058; No 5.

Teacher Load

15. The number of pupils in composition classes must not be excessive. Yes; No. A reasonable rule is to give each teacher one of the following combinations:

(a) Three classes in literature and three in composition averaging 25 pupils each.

(b) Two classes in literature and three in composition averaging 30 pupils each.

(c) Three classes in literature and two in composition averaging 27 or 28 each.

Experiments in classes of 60 in literature have been made, but results as yet are in doubt.

Libraries

16. Suitable libraries, trained librarians, and special instruction in the use of libraries are necessary.—Yes 1126; No 24.

In 1930 the North Central Commission on Secondary Schools recommended the following provisions for libraries in secondary schools.

I. *Personnel.*

(a) Schools of 1,000 or more pupils should have at least one full-time librarian who is professionally trained and holds a bachelor's degree or its equivalent.

(b) Schools of less than 1,000 should have a part-time teacher-librarian with technical library training.

(c) Proper credit should be given schools for aid given to them by public library personnel.

II. *Books and Periodicals.*

(a) A catalogued library of 800 live books chosen so as to serve school needs.

(b) About 15 periodicals chosen so as to serve school needs.

(c) Proper credit should be given for public library aid.

III. *Budget.*

(a) At least 200 dollars a year for books and periodicals.

(b) At least 75 cents a pupil.

English Rooms

17. Special English rooms, equipped with books and filing devices, are highly desirable. Each school should also have a small dramatics room with a stage.

Teacher Training

18. Properly trained teachers are indispensable. As a minimum the following is suggested: Professional courses, 15 hours; rhetoric, 15; literature, 15; public speaking, 5; foreign languages, 15; history, 6; mathematics, 3; science, 3. Total, 77. Electives, 43.

Attitudes at Grade XIII

19. At the end of Grade XII, the average graduate should possess a working knowledge of the essentials of good usage; should be interested in the correct and fluent use of the English language both in speech and writing; as an ideal at least should regard slovenly English as being in the same category with dirty hands; should have a rooted habit of correct speech; and should possess some power in its effective use. On the appreciation side he should know the main facts of the history of English and American literature and be familiar with a few great books; should have an interest in reading and a somewhat cultivated taste in books; should have the habit of reading for pleasure; and should possess the power to read intelligently.—Yes 1116; No 14.

Revision of Report

20. The foregoing plan should be conceived of as temporary and subject to revision in the light of further study and experience. The committee regards it as sufficiently conservative and at the same time progressive enough to justify its adoption at the present time, but recommends that it be revised at intervals of three or four years so that full advantage may be taken of the best modern thought and experience. For example, the establishment of clinics in spelling, handwriting, and silent reading may be safely recommended at this time as experiments which may ultimately result in a better adjustment of the English teacher's load, in important reductions in the cost of English teaching, and in the improvement of the product of that teaching.—Yes 1098; No 16.

Summary

The foregoing pages may be summarized, recapitulated, and explained as follows:

A critical examination of the questionnaire which was prepared by the English Committee of the Commission on Unit Courses and Curricula, and of the judgments of some 1,200 people who reacted to that questionnaire, has led the Com-

mittee to select several phases of the English program for somewhat extended explanation. The phases selected for amplification, all embodied in the questionnaire, represent conceptions of English instruction that are essentially modern but not radical or unworkable.

1. *A curriculum of experiences.* The report of the Committee as represented in the Official Questionnaire, and the opinions of the judges who reacted to the questionnaire are in favor of the modern conception of the curriculum. The major objectives of training in the mother tongue are (a) habits and skills necessary for effective and accurate reading, writing, and speaking; (b) attitudes and outlooks which characterize a respect for decent expression and a real enjoyment of good books, and (c) certain information about the mother tongue as a language and about the literature of the mother tongue as an inheritance of the English speaking races.

With these objectives in mind has come a somewhat new conception of the English curriculum. It is no longer looked upon as a series of blocks of subject matter to be learned. Subject matter in itself cannot develop habits or skills or attitudes. The curriculum is the series of pupil activities which, to be sure, center around subject matter. The curriculum is a series of *processes* dealing with subject matter.

Both oral and written composition are best taught by the following cycle of processes: 1. Choice of subject; 2. Gathering of material; 3. Organization of material; 4. Oral composition. If the composition is to be written, the following additional processes are recommended: 5. Written composition; 6. Revision (which involves grammar and rhetoric); and 7. Publication (a) reading to an audience in class or club; (b) mimeographing; or (c) printing.—*(votes 1033-36).*

The aim of literature-reading instruction is to develop in the pupils the power to understand, feel, and appreciate the ideas, emotions, and aspirations of others. In other words, it is to build up the power and habit of re-living experience. *(votes 1050-19).*

The study of literature should create in pupils a desire to read and the habit of reading. It should be conducted so as to form in the learner well-defined tastes with regard to the type and quality of his reading and so as to enable him independently to select books for his avocational or vocational readings.—*(votes 1162-2).*

These excerpts, and the almost unanimous votes in affirmation, imply, beyond any question, the conviction that *abilities* in terms of habits, skills, attitudes, appreciations, knowledges, are the supreme goal of instruction in English. Abilities can be developed only by experiences; habits and attitudes grow out of successful experiences in appropriate action-patterns. In other words, the English departments of secondary schools must cease thinking of the curriculum in terms of so much subject matter; they must begin to think of the curriculum as made up of pupil experiences in appropriate action-patterns.

2. *Functional grammar.*—

3. *Remedial reading.*—

4. *Varied patterns in the literature curriculum.* The report sets itself strongly against a conception of the literature curriculum which, year after year, guides pupils through identical, or at best very similar, action-patterns. Close examination of the report itself, and of the strongly affirmative trend of the votes on the items quoted below is evidence that *differing* and *varied* patterns of experience are far preferable to a single pattern like the yearly repetition of the study of types of literature.

General statement: (paragraph 10, "The (course of) study of literature in grades 7-12, inclusive, may well be constructed to include *various patterns* (functional patterns for the junior high school; types of literature patterns and historical patterns for the senior high school)." *Vote 1162-2.*

"The study of *world literature arranged by types* and including selections from many languages in translations

would be wise."—*Grade 12. Vote 954-111.*

"It is probably best to make this year a study of *English literature arranged chronologically* beginning with the Anglo-Saxon Period."—*Grade 11. Vote 924-141.*

"In the tenth grade it is wise to consider *American history as interpreted through American literature.*"—*Grade 10. Vote 1053-26.*

Thus for the three years of the senior high school the report recommends strongly three different patterns of approach: by types, by chronology, and by correlation with history.

The report probably should also have recommended for the senior high school various other electives, certainly for larger schools, in dramatics, debating, creative writing, contemporary literature, and the like.

"Material ought not to be spread miscellaneously before pupils, but ought to be functionally grouped according to its spirit and its message."—*Grade 9. Vote 919-68.*

"In the junior high school, this and similar material ought to be organized and systematized about units of daily life."—*Grade 8. Vote 1024-36.*

"For the literature work of the junior high school grades, the general principle of organization should be some systematic interpretation of happy and successful living."—*Grade 7. Vote 1090-20.*

"For the general reading for this and the following grades there should be provided a wide range of books, papers and magazines dealing with wholesome living, worthy home membership, vocations, citizenship, the worthy use of leisure, and right conduct."

Thus for the three years of the junior high school the study strongly recommended patterns of experiencing literature based upon the functional, not upon the literary or historical, values of literature. This program, distinctly in accord with the program of the National Junior High School Committee on English[1], seems to have decided advantages: (1) It makes a natural distinction between the experience patterns of the junior and the senior levels, respectively: for the former, functional patterns; for the latter, artistic and historical patterns. (2) The program for Grades 7-9, inclusive, and possibly for Grade 10, will enable the English teacher to correlate English instruction with the learning of pupils in social science branches, with which English is most naturally associated. (3) In line with the seven cardinal objectives of Education which the North Central Association has always vigorously championed, the English report tends, in the literature branch (and even more in the composition branch), to make educative experiences less academic and more closely associated with the needs, interests, problems, and activities of daily life.

The affirmative votes are strongly in the majority in all of the issues raised by the paragraphs from which the excerpts quoted above are extracted. This would appear to indicate that a large majority of voters favored functional patterns for the lower school and historical or artistic patterns for the higher school. The affirmative votes may have been actuated by parts of the respective paragraphs not here quoted; and the negative votes may have been caused by objections to parts of paragraphs not here quoted. However, a fair assumption is that most of the voters knew what they were voting for. They expressed themselves as being in favor of guiding pupils through a literature curriculum of varied patterns, postponing strictly college preparatory literary study to the senior high school, and emphasizing functional patterns in the junior high school.

Committee

Chairman—E. L. Miller, Assistant Superintendent, Detroit Public Schools, Detroit, Michigan
F. H. Bair. Superintendent of Schools, Shaker Heights, Cleveland, Ohio
Miss Essie Chamberlain, Oak Park High School, Oak Park, Illinois
Thomas W. Gosling, Superintendent of Schools, Akron, Ohio

[1]The Junior High School Curriculum, Fifth Year Book, Department of Superintendence, 1927, pp. 132-38.

W. Wilbur Hatfield, Secretary of National Council of Teachers of English, Chicago, Illinois

Miss Rewey Belle Inglis, 1929 President of the National Council of Teachers of English, Minneapolis, Minnesota

Prof. R. L. Lyman, University of Chicago, Chicago, Illinois

E. H. Kemper McComb, Principal, Emmerich Manual Training School, Indianapolis, Indiana.

Miss Sarah T. Muir, Lincoln High School, Lincoln, Nebraska

Marquis E. Shattuck, Director of Language Education, Detroit, Michigan

Miss Ruth Mary Weeks, Paseo High School, Kansas City, Missouri. 1930 President of National Council of Teachers of English.

A Handicap in High School Dramatics[1]

By H. H. RYAN
Principal, University High School
University of Wisconsin, Madison

For a number of years the writer has been impressed with the dire poverty of the field of plays for use in high school dramatics. The teacher of dramatics or the play coach, as he approaches the problem of choosing a play, finds himself confronted with an array of possibilities which fall mainly into four classes.

A. The slap-stick and melodramatic affairs of the previous generation, full of comedy characters as someone of that day conceived them. These worn out themes offer very little to a high minded teacher.

B. Home-product dramatizations of pieces of literature found in the courses in English. These ordinarily kindle little enthusiasm. Pupils and parents take to the dramatizations no more readily than they do to the reading of such material.

C. The paranoid type of play, portraying some highly imaginative state of affairs or succession of events, such as "Three Pills in a Bottle" or "Six Who Pass While the Lentils Boil." Here we find the world's most insipid form of escape from reality.

D. The more or less salacious plays used by the professional players on the legitimate stage or on the screen. The high school teacher has a great deal of difficulty in adapting the malodorous drama prepared for the palate of the ultra-broadminded.

Even if the play coach does swallow his disappointment and make up his mind to use one of these plays, he usually finds it controlled by a publishing company which demands a flat royalty of twenty-five or fifty dollars, regardless of the income from the performance. Many a coach and cast find themselves, after the play is over and the money has been counted, confronted with the problem of making up a deficit occasioned by royalties out of all proportion to the value of the play and the size of the house.

High school dramatics has the opportunity to render a real service to the rising generation. The present-day theatre-going public suffers from an appetite sated with highly concentrated food. In days gone by, we used to be satisfied with some discrete elaboration of the principle that there are in this world two mutually attractive sexes; now we demand all in the way of abnormality and perversion that the imagination can conceive. The typical demand of the theatre-goer is for something more purient, more stupendous, more spectacular, more incredible than what he saw last week. In our attitude toward the drama we have come to be like the glutton who refuses the soup and meat courses but insists on a diet of ultra-caloried desserts and high-powered cheeses.

The hope for a restoration of normal appetites, with growth in taste, lies very largely in the hands of the high school play coach. The solution would seem to be: first, the writing of plays for high school pupils by teachers and other persons who are familiar with the interests of high school pupils. There are already many plays of this kind in use locally. If there were a broad and steady market for such, many others would be written. Second, there is the problem of collecting and publishing these plays. It is a matter of conjecture whether a publishing company would find such a venture a profitable one; if not, the enter-

[1]This article is being printed at the request of Chairman Deam of the Commission on Unit Courses and Curricula. The topic discussed here has a direct relation to the work of the Committee on Extra Curriculum Activities—The Editor.

prise merits such encouragement as an organization like the North Central Association or the National Association of Secondary School Principals could give it. This Association might undertake, as an enterprise of its own, the collection and publication of such plays; or it might cooperate, even to the extent of subsidy, with some publishing company.

That there are here a real problem and a real opportunity seems evident. Very few of the objectives of education can be served by the type of play now used; and it seems certain that some of these objectives are in a measure defeated thereby.

The North Central Policies on Vocational Education are Questioned

J. B. EDMONSON, Secretary

Has the North Central Association adopted arbitrary requirements that hinder the development of vocational instruction in secondary schools? Is the North Central Association unfriendly to the introduction of vocational units into the secondary schools? These questions define the principal issues raised in some correspondence between Mr. C. F. Klinefelter, Special Agent, Industrial Education, of the Federal Board for Vocational Education, Washington, and the Secretary of the Association. Because of the growing importance of vocational education in the secondary schools the Secretary's reply to Mr. Klinefelter is printed in full. In the preparation of this letter the Secretary had the counsel and advice of Professors Carrothers, Elliff, Hotz, and Reed of the Commission on Secondary Schools and Dr. C. H. Judd of the Commission on Institutions of Higher Education.

My Dear Mr. Klinefelter:

I am very glad to have the opportunity to answer the fourteen questions proposed in your letter of January 17, 1931, as I recall our recent conversation regarding the attitude of the North Central Association toward work in vocational fields. As I stated at that time it is my opinion that the views of the North Central Association on vocational education have been grossly misrepresented by persons who have led you and others to believe that our Association defines certain arbitrary standards governing instruction in vocational subjects.

In order to avoid misunderstanding I am quoting your questions and giving my replies.

QUESTION 1—"Provided a proper number of hours are devoted to recitations and laboratory work, does the Association undertake to prescribe in any way the character of the content of science or mathematics courses in acredited schools?"

ANSWER—In answer to this question I wish to explain that the North Central Association makes many recommendations regarding the objectives and range of work to be included in the various subjects. Much of this material is prepared by the Commission on Unit Courses and Curricula. The Association has, however, never attempted to make these recommendations the equivalent of requirements. The Association has never asked for information from the schools regarding the attention that is given to the recommendations regarding the character of the content of courses. In other words, the Association has never attempted to make any prescription concerning the contents of a course that is taught. Its actions have always been purely suggestive or recommendatory.

QUESTION 2—"In rating accredited high schools with reference to qualifications of teachers, would the presence in the faculty of a school, of a teacher without 'satisfactory' academic qualifications, but who is in fact doing a good job, result in lowering the rating of the schools?"

ANSWER—The Association has set requirements for teachers of academic subjects, but has never at any time had requirements regarding the preparation of teachers of non-academic units. In most of the states there are certain requirements that must be met by all teachers, including teachers of vocational subjects. Our Association has, however, limited its definitions of preparation to the teachers in academic fields.

QUESTION 3—"In rating accredited schools with reference to the qualifications of teachers, are vocational teachers rated with the academic faculty?"

ANSWER—I do not understand just what you mean by "rated" as used in this question. It is my impression that the answer

to question 2 takes care of the issue that you raise in question 3. The Association makes no prescription regarding the qualifications of teachers of vocational subjects.

QUESTION 4—"Does the Association rate vocational teachers at all? If so, on what basis?"

ANSWER—This question is covered in the answer to question 2.

QUESTION 5—"Has the Association any official concern with any function of high schools which does not deal directly with college entrance preparation?"

ANSWER—The North Central Association states its objectives as follows:

CONSTITUTION, ARTICLE II. "The object of the Association shall be to establish closer relations between the secondary schools and the institutions of higher education within the North Central States and such other territory as the Association may recognize.

"All decisions of the Association bearing on the policy and management of secondary schools and institutions of higher education are understood to be advisory in their character."

AIMS OF THE ASSOCIATION. "The aims of the North Central Association of Colleges and Secondary Schools are, first, to bring about a better acquaintance, a keener sympathy and a heartier cooperation between the colleges and secondary schools of this territory; second, to consider common educational problems and to devise the best ways and means of solving them; and third, to promote the physical, intellectual and moral wellbeing of students by urging proper sanitary conditions of school buildings, adequate library and laboratory facilities, and higher standards of scholarship."

QUESTION 6—"Through what procedure does the Association derive its authority to prescribe standards for high schools?"

ANSWER—The North Central Association is a voluntary organization and has only such power and influence as it is enabled to secure through the support given it by its members.

QUESTION 7—"Has the Association any official concern with high school students pursuing college preparatory courses, who do not go on to college?"

ANSWER—This question is answered by my reply given to question 5. It is the general assumption that a high quality of work in college preparatory courses will lead to the development of high standards of work for all pupils.

QUESTION 8—"In the case of high schools, able to give only college preparatory work to their students, if it were to become evident that a radical change in the character of subject matter would greatly increase the educational value of such schools to their communities and students, on what basis would the Association consider the situation with regard to accrediting?"

ANSWER—This question is answered in large part by the answer given to question 1. It may also interest you to know that the constitution of the Association contains a provision which makes it possible for schools to experiment with new instructional policies without endangering their standing with the Association.

QUESTION 9—"Does the requirement, limiting the teaching load in accredited schools to six periods a day, apply to shop teachers?"

ANSWER—The Association does not attempt to define the teaching load of non-academic teachers.

QUESTION 10—"On what basis are official credits for shop work determined?"

ANSWER—This problem is left to the various state departments of public instruction and to the higher institutions. The following definition of a unit of work is however generally observed:

"A unit course of study in a secondary school is defined as a course covering an academic year that shall include in the aggregate not less than the equivalent of one hundred twenty sixty-minute hours of classroom work—two class periods of unprepared work being equivalent to one class period of prepared work."

QUESTION 11—"What are the maximum number of credits allowed for vocational courses in accredited high schools—

a. Shop-work_____credits?
b. Trade mathematics_____credits?
c. Trade science_____credits?
d. Trade drawing_____credits?"

ANSWER—The Association has never taken action regarding this matter since, as has

been stressed in previous answers, it limits its activities to the academic fields.

QUESTION 12—"Does the Association refuse to recognize the educational value of any work—

a. For which the student is paid?
b. Which the student carries on outside of school?
c. Which the student carries on in the occupation under the supervision of the school?"

ANSWER—The answer given to question 11 would apply here.

QUESTION 13—"Has the Association definitely gone on record or officially decided that teacher-training lies outside of the scope of its activities?"

ANSWER—I am certain that the Association has never gone on record as declaring teacher-training is outside its activities. The Association accredits higher institutions that engage in teacher-training. It has however been the policy of the Association to leave to the higher institutions a very considerable amount of freedom in determining institutional policies.

QUESTION 14—"Does the Association prescribe methods and content in a given subject in the college preparatory course of an accredited school? If so, on what basis?"

ANSWER—The answer to question 1 would apply to this question. As was emphasized in this answer the Association leaves to the high schools a very large amount of freedom in determining the kind and amount of work included in a unit. In the accompanying statement of regulations and standards you will find that there is much freedom left to the schools. You will find also that important issues relating to the curriculum are not covered by the standards. It is true that many of these are covered by state regulations, but the Association has no responsibility for the enforcement of these state regulations.

I hope that the foregoing answers will be helpful to you in clearing up certain misunderstandings. After long experience in the field of high school inspection in Michigan and after six years as Secretary of the North Central Association of Colleges and Secondary Schools, I am convinced that the secondary schools have a very large amount of freedom in determining what is to be taught and how it is to be taught. The fact that certain changes have not been made in the secondary schools is traceable in my opinion to the marked conservatism of high school administrators and teachers and to the failure of the advocates of new ideas to present convincing arguments. The secondary schools of the North Central territory are not in my opinion restrained by standards of our Association from the introduction of new courses or new materials.

I wish to urge that you attend the forthcoming meeting of the North Central Association in order that you may become better acquainted with the spirit and the scope of the activities of our Association. I am certain that your attendance would help to bring about a better understanding of the issues raised in your letter. With kindest personal regards, I am

Very truly yours,
J. B. Edmonson,
Secretary

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